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No. XVI. OF VOL. I., 1933. LONDON, SATURDAY, APRIL 22, 1933 Pp. 112 — Price 1s.

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No. 5721 LONDON, SATURDAY, APRIL 22, 1933 CCXXIV

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II.—DISORDERS OF MOTILITY

Before discussing the disorders of motility I must say a few words about the results of *duodenal intubation in normal people*. At first I experimented on young men, but later, noting that most of the disordered states were found in middle-aged women, I changed to normal subjects in this group. The difficulty of finding such persons, on whom one can practice intubation, is very great, but I have been fortunate enough to find six who had normal digestive and biliary tracts and some excuse for duodenal intubation (Table I.). The time taken to pass the tube into the duodenum varies greatly with the type of stomach, usually from 20 minutes to an hour. Gastric residue analyses were all within normal figures, there were no achlorhydrics. Gastric pressures were usually small, peristaltic waves putting up the pressure to about 10 cm. of water suddenly, with a slower fall, were observed. Respiration produced rises and falls of about 1 cm. The duodenal juice was alkaline in all but two cases and contained only traces of bilirubin. The duodenal pressure was zero, with fluctuations of about a millimetre with respiration. Administration of 20 c.cm. of olive oil by the tube evoked a flow of bile in 12 minutes or less as a rule. The first few cubic centimetres are pale and come from the bile-duct ("A" bile), but this tends to be contaminated by "B" bile. The "B" bile contained about 30 mg. per 100 c.cm. of bilirubin, in some instances more.

The "B" bile is, of course, not pure gall-bladder bile, but a mixture of it and liver bile,[51 52 41] and the proportions depend entirely on the method by which it is obtained; by the pituitrin method it contains up to 300 mg. per 100 c.cm.[25 50 53] That "B" bile comes in part from the gall-bladder we know, because (1) it has been recovered by the tube while the gall-bladder was visibly contracting[37 38 20]; (2) it contains higher proportions of solid constituents than liver bile ever does; and (3) it is not obtainable after cholecystectomy.[43 52 8] That it is not pure gall-bladder bile we know because it is not so concentrated as gall-bladder bile obtained by puncture at operation, or at autopsy, and because the flow of liver bile is increased during digestion (see Pavlov's experiments, described in any physiological text-book). This liver bile must escape direct into the duodenum mixed with the gall-bladder bile, because it is obviously impossible for the gall-bladder to fill and empty simultaneously. The flow of "B" bile in normal subjects lasted about ten minutes. Intravenous injection of gr. 1/40 of pilocarpine nitrate caused a mixture of vagal and sympathetic effects. One of two things happen, both in normal and abnormal subjects: either (1) there is a preliminary sympathetic phase, with tachycardia, rise of blood pressure, and flushing of the face, followed by a vagal phase with sweating, intestinal borborygmi, slowing of the pulse, and salivation; or (2) simultaneously there appear tachycardia, sweating, salivation, &c. In the latter case, the effect on the biliary apparatus is that of vagal stimulation. The effect on the bile flow must be correlated with the general symptoms to be certain whether the effect is vagal or sympathetic. During the vagal phase, which is manifested by sweating and salivation, all normal subjects showed an immediate increase in rate of bile flow. Large doses of pilocarpine cause pure vagal effects, but are horribly unpleasant to the patient.

Biliary Dyskinesia

The disorders of motility of the extrahepatic biliary system have been suspected for many years. The history of the evolution of this idea would need a separate paper, but I would like to call attention to the work of Aschoff[3] and Berg,[6] to both of whom falls the honour of having conceived the possibility of purely functional derangement, with only secondary anatomical changes. Many clinicians must have suspected such a possibility in those patients with liver and gall-bladder pain without structural cause,

* The Goulstonian lectures for 1933, delivered before the Royal College of Physicians of London on March 7th, 9th, and 14th. Lecture III. will appear in a forthcoming issue.

TABLE I.—DUODENAL INTUBATION: NORMAL SUBJECTS

Case	Sex and age.	Gastric pressure on respiration.	Gastric peristaltic pressure.	Time taken to pass tube.	Bilirubin in duodenal fluid.	Bilirubin in "A" bile	Time taken by oil to evoke flow.	Bilirubin in "B" bile.	Effect of pilocarpine gr. 1/40.	
									Sympathetic.	Vagal.
		cm.	cm.		mg.*	mg.*		mg.*		
1	F 57	1	6	50 min.	1·5	3	2 min.	52	Nil.	Immediate increase.
2	F 59	0	10	20 „	0·3	—	5 „	20	Tachycardia.	„
3	F 48	1	20	20 „	2·0	5	8 „	28	„	„
4	F 60	2	2	45 „	1·5	4·5	18 „	42	Nil.	„
5	F 48	1	0	1¼ hrs.	0·5	—	15 „	32	Tachycardia and flushing. Cessation of flow.	After 30 sec. salivation and increase.
6	F 55	½–1	50	25 min.	2·0	7·5	5 „	105	Tachycardia.	Immediate increase.
7	M 26	1–2	10	20 „	1·0	—	10 „	45	„	„
8	M 32	1	14	25 „	0·5	5	12 „	32	Tachycardia with extrasystoles.	„
9	M 22	1	10–12	1 hr.	2·2	2·8	11 „	28	Not given.	Not given.
10	M 24	½	8	30 min.	0·25	10	15 „	59	Tachycardia and flushing. Cessation of flow.	Slow pulse, salivation, increase flow.

* per 100 c.cm.

but unfortunately adhesions and "inspissated bile" provided a facile explanation which suppressed thought for many years. The whole subject of biliary dyskinesia was put on a new basis by Westphal,[53] and it was the book he wrote in collaboration with Gleichmann and Mann [55] which inaugurated a new era; my own work dates from the time when I read it, at Prof. Aschoff's instigation, and I would like to acknowledge without stint my indebtedness to this great work. Unfortunately the description of the dyskinetic diseases was made, in this book, subsidiary to investigations on the ætiology of gall-stones, of much less value in my opinion, and with which I almost wholly disagree. This was, I think, the only part of the book noticed by reviewers in this country.

On the basis of the physiology of bile expulsion, which I dealt with in my last lecture, Westphal described firstly cases in which the vagus was over-sensitive, leading to over-rapid emptying of the gall-bladder, or to spasm of the ampulla of the organ of Vater and complete cessation of bile flow. Also cases in which the vagus was under-sensitive (or the sympathetic predominant), leading to relaxation of the gall-bladder and ampulla, and spasm of the sphincter of Oddi, again with cessation of bile flow. How far this neurological concept can be said to be a complete explanation of these states I am doubtful, they seem to me to be due to constitutional and acquired factors like other diseases, but the disorders of motility behave as if disordered innervation were the final common path by which the causes act. I would like to stress that any division of these dyskinetic states into hard-and-fast entities is artificial; there is a continuous series of stages of departure from normality, to which different cases correspond, and the same case may show different degrees of the process at different times.

Concerning biliary dyskinesia in general one may say that the symptoms tend to be similar whatever the type, because the pain is due to distension of the biliary tract, and the distension of a hollow viscus causes pain varying in its intensity rather than kind, according to its different causes. The pain resembles the pain of gall-stones in a mild form (the pain caused by gall-stones in the non-muscular ducts must also be due to acute distension—this was suggested by Riedl in 1901 [39]). Cases of gall-stone symptoms without gall-stones, of "cholecystitis" with a normal gall-bladder at operation, of "hepatic neuralgia," and of return of symptoms after cholecystectomy are familiar to all. These are cases of biliary dyskinesia. I need hardly say that there is never any pyrexia, unless there is some other cause for it, and no occult blood in the stools. All my cases were most carefully investigated to exclude the possibility of an organic disease; in many instances by other physicians as well as by myself.

Spastic Distension

Spastic distension is the commonest of the motor disorders and the easiest to cure. Like all biliary diseases, it is more frequent in women than in men (Table II.). The average age at onset is about 36 years. The usual type of person who suffers from this disorder is heavily built, with a wide costal angle, and broad shoulders, but not fat. Patients who were not of this type were dysplastics with costal angles of about 90°, narrow shoulders but powerful forearms, and more than a tendency to axillary sweating. They were all very active, bodily and mentally, some given to exertion and athletic sports, and others to hard work. Some described themselves as "overstrung" by nature.

The principal complaint is of *pain*, of a dull grinding character, coming on in spasms like colic but not so severe, and lasting for many minutes at a time. There is also a constant feeling of soreness. In distribution, the pain is located in the right upper abdomen, often in the gall-bladder area, and spreads across the abdomen, along the rib margins, becoming as severe on the left as on the right. It tends to spread through to the back, particularly to the angle of the right scapula. It is often related to tiredness or exposure to cold, or may come on an hour or two after meals. It is sometimes relieved temporarily by food. It is apt to come on in the night, like the pain of duodenal ulcer, which it resembles also in that symptoms are often intermittent, attacks of days or weeks being followed by a period of relief. Instead of pain, there is sometimes distension or a feeling of fullness after meals. *Nausea* is very common, and some patients vomit occasionally, the vomit consisting of acid food. Vomiting, if it happens, relieves the pain (as it sometimes does in gall-stone colic). A history of flatulence can be elicited, but it is seldom volunteered—that is to say, it is only slight. The *appetite* is poor, and most patients *lose weight*, sometimes seriously. The patient may look quite well, or haggard, grey, and very ill. There is often a history of slight *jaundice* during the attacks. I have never seen it myself nor have the doctors reported it, but subicterus has been described in biliary dyskinesia.[14 12 55 45] It may be only the sallowness associated with colicky pain. The bowels are usually open more than once a day, less often there is constipation, with a palpable, hard tender descending colon of the type associated by radiologists with "spastic constipation." The "diarrhœa" corresponds to the "diarrhée prandiale" of Linossier,[14] p. 218.

The tongue is clean, or pale and flabby, not coated. The liver region is tender, especially over the gall-bladder, but without rigidity or a definite catch in the breath as the gall-bladder comes down on the palpating hand. The liver feels normal. There is usually a "soreness" on pressure over the liver behind, which must be a skin sensation, as it is different from the tenderness in front and the ribs protect the liver from actual pressure. It is remarkable how many of the patients show extrasystoles, of which they are sometimes conscious when the attack is at its worst. They are unusual in normal persons of this age, and they, as well as the sinus arrhythmia observed in one woman of 37, are both cardiac manifestations for which the vagus may be responsible.

Cholecystography shows an opaque, well filled, well concentrating gall-bladder, of at least normal size, which diminishes after the fatty meal but does not disappear, and which shows a delay in emptying, at any rate by the standards I have mentioned. I have only once seen any sign of the dilated ducts figured by Bronner,[10] and then not so clearly.

Radiographically the stomach is of the small, horn-shaped tonic variety, emptying rapidly or showing a delay due to pylorospasm, not to atony.

Intubation is usually easy. The gastric juice contains high normal or excessive amounts of hydrochloric acid, the manometer shows powerful and frequent peristaltic waves, but only small respiratory fluctuations. The duodenal juice contains little or no bilirubin. Oil excites a good flow of bile after a prolonged latent period (15–30 minutes). The "B" bile contains 40–90 mg. per cent. of bilirubin. Pilo-

carpine causes an initial cessation of flow for up to five minutes, then a great increase in rate as the general symptoms pass off; to note this the effect must be carefully correlated with the general symptoms.

This is a description of the typical clinical picture of the disease. It will be seen from the Table that there are exceptions to all the findings, but that is only to be expected. There is seldom a pathognomonic sign in medicine, or a completely typical case of any disease, and in biliary dyskinesia, as in all subjects in medicine, it is necessary to collect all the data and use intelligence. The history is at least as important as the results of duodenal intubation. The clinical picture of spastic distension, then, is explicable as an overfilling of the extrahepatic biliary system by defective emptying, the expulsion of bile being prevented by spasm of the vagus-innervated muscle in the ampulla. The gastric and colonic activity, and the cardiac signs, are also such as could be caused by over-activity of vagus-innervated structures. The results of treatment fully bear out this theory. I have not been working at the subject long enough yet to see what changes are there at autopsy (the disease is not fatal), but I have seen cases in the post-mortem room which showed the great hypertrophy of the ampulla muscle, slight but definite dilatation of the extrahepatic ducts, and large but strong-walled gall-bladder with lymphocytic infiltration of the mucosa and deepening of Luschka's crypts described as characteristic for this disease.[3] Aschoff's original description of *Stauungsgallenblase* corresponds to this type (although he made no note of the ampulla and sphincter). Berg's "mucostasis" is also virtually a description of this disease,[6] and the morbid anatomy has been described in detail by Westphal.[55]

The *treatment* of spastic distension is by diet and medicine. The essentials of diet are small, equal, and regular meals, the avoidance of mixtures of fats and starches, and restraint in both coarse irritating foods and over-interesting cookery. This entails taking meals at specific times, making breakfast and tea rather larger, and lunch and dinner rather smaller, and refraining absolutely from such things as buttered toast, mashed potatoes (with butter in them, that is), and "white sauce." Milk puddings do not come under this interdict. Bread and butter is to be avoided, toast "melba" should be substituted, without butter. It is worth while to investigate the patient's customary diet, dislikes, and fancies carefully, and to write out a complete list of what may and may not be eaten. In general, perfectly ordinary simple English cooking provides what is needed, and if it is good it involves no hardship. Indeed, hardship is to be avoided, because there is danger of rigorous dieting and consequent loss of weight, which I always try to prevent, but which many patients (they being mostly women) unfortunately welcome. To avoid loss of weight, to supply the deficiency in fats, and to empty the gall-bladder during the resting period, I instruct patients to take an ounce of butter, olive oil, or cream last thing at night. This they are usually very glad to do, because a desire for fats is natural on a diet in which it is not possible to mix fats and starches.

Medicinally the essential drug is belladonna, which I give in the form of the tincture, starting with ℥ 10 three times a day after meals. The dose to aim at is one which produces a definite vagal inhibition without unpleasant symptoms; it varies in different people and can only be found by trial, remembering that it is useless to give too little, but that the good effect of the proper dose is appreciated within a week at the outside. The belladonna is given in a mixture with sodium bicarbonate grs. 15 to modify the excessive acidity, which, as I mentioned in the previous lecture, has been shown to stimulate the flow of bile in normal people—that is, to over-stimulate and cause spasm in these patients. I make the mixture up with infusion of rhubarb, which has a comforting effect on the stomach for which I can vouch, without being able to explain it. The treatment is extremely satisfactory; the disappearance of the pain and nausea, the return of the appetite (although many are afraid to eat for fear of a relapse), the return of the single daily evacuations, and the wonderful relief of misery and general feeling of illness make this one of the diseases which it is a positive delight to treat. I know that all new treatments have a way of being brilliantly successful, but I think my enthusiasm in this instance will be tempered by my moderation in regard to the treatment of atonic distension.

Atonic Distension

Atonic distension I have seen four times. The details can easily be followed in Table III. In contrast to the spastic group it will be noticed that these patients were older and of a different type. They were slim-built, with narrow costal angles, sloping shoulders, and poor muscular development. The typical clinical picture would seem to be this: The pain is a continuous, not spasmodic, but a heavy aching sensation. It comes on soon after meals, and radiates all over the epigastrium, but not to the back. The gall-bladder region is the point of maximal discomfort. The appetite is poor and the patient is constipated. There is always a complaint of flatulence. There may be occasional vomiting, but surprisingly little nausea (the nausea of the spastic type is possibly due to pylorospasm). There is usually tenderness in the epigastrium and over the liver region. The stomach contains very little acid and often no free hydrochloric acid. It tends to be atonic and baggy in the barium meal films, with a delayed emptying.

Cholecystography shows a very long thin gall-bladder, which throws a poor shadow and empties very little. It is apt to take some time to pass a tube into the duodenum. The only occasion on which I passed one quickly I had suspected the state of the stomach and done all I could by raising the foot of the bed, &c., to facilitate matters. The gastric pressure is low, without peristaltic waves, but with a wide respiratory fluctuation. The duodenal fluid contains escaped bile, but oil only evokes a flow after a long pause; the flow is increased by pilocarpine without a latent period. The "B" bile contains low normal amounts of bilirubin. The morbid anatomical appearance to which atonic distension corresponds is the long, thin-walled gall-bladder, with a deeply bile-stained mucous membrane. Such gall-bladders are seen occasionally at post-mortem examinations, and a similar kind, with great distension, is not uncommon in the bodies of old persons. The bile-ducts are hardly, if at all, dilated, and the muscle of the ampulla is not hypertrophied. Atonic distension corresponds to the "atony" of Chiray and Pavel[14] and to Berg's "cholestasis."[6]

The treatment of atonic distension is not nearly so effective as that of the spastic form. As regards diet, fruit and salads are encouraged; green and root vegetables, cheese, porridge, milk puddings, and all sodden doughy foods should be avoided and meals should be taken dry. The resources of cooking,

tasty and appetising food may all be encouraged. In other respects the diet is the same as for spastic distension, including the nocturnal dose of fat. It is in drugs that we are handicapped. Whereas we have admirable vagus depressors and sympathetic stimulants, we have no sympathetic depressor or vagus stimulant which does not make the patient feel very ill. At present I fall back on the drugs which stimulate gastro-intestinal motility. Best of these is spirit. armoraciæ co. (℥i.), the common horse-radish, an old-fashioned but very useful drug, whose activity has only recently been scientifically substantiated.[55] Ol. menthæ pip. (♏ss.—i.) and menthol in gr. 1 pills are also useful, the latter is a valuable remedy which I learned from Dr. A. Whitfield, who used it for the dyspepsia of rosacea. Strychnine, ginger, capsicum, and the other carminatives are not much use. The treatment of the hypochlorhydria is one of the chief difficulties. Although the reverse is usually true in ordinary hypochlorhydric dyspepsia, I think acid after meals is better than alkalis before in this instance. This is probably because of the stimulating effect on the biliary apparatus of acid in the stomach. The use of vinegar, pickles, and acid drinks as a large item in the diet suggested by Brooks [9] I have not yet tried, but it sounds very plausible. Under treatment patients improve, but the result is by no means as dramatic as the cure of the spastic state. It is in a way a more interesting treatment, because being unsatisfactory it gives more scope for investigation and improvement. Dehydrocholic acid is under investigation at the moment, and there is a further possibility in the German homœopathic remedy—tincture of sea-thistle.[55]

The Two Types and Their Interpretation

These are the two fundamental types of motor disorder, and before proceeding to the other varieties it would be well to consider them in general terms. In the first place, they fall into two types corresponding to over-activity and under-activity respectively. They may then be interpreted in terms of a disorder of innervation, of inborn constitution, or of muscular activity. It is important to notice that the gall-bladder disorder is associated with disorder of other muscular organs—the heart, the stomach, and the colon, which have a similar innervation. Just as it was necessary to point out that the gall-bladder could not be considered as a physiological unit, but as part of the extrahepatic biliary system, which acts as a whole, so it must be realised that dyskinesia of that system is a part of a dyskinesia of many organs. One refers to these as "gall-bladder diseases" just as one refers to "kidney diseases," knowing perfectly well that both are half truths, a nomenclature of convenience. So long as this is consciously realised it does not matter, but the tendency to specialisation in thought is not confined to specialists in practice, and nothing leads so subtly to misconception as the continued use of a name. The plurality of organs affected makes it unlikely that there can be a strictly local cause for the biliary disorders, but it does not make it impossible. An inflamed appendix can, for instance, cause functional derangement of the stomach and structural alteration in the mouth—the furred tongue. We must therefore consider two possible local causes; structural changes in the gall-bladder and alteration of the bile itself.

That biliary distension might be due to structural changes was put forward by Schmieden [48 49] as the explanation of the motor disability. As I pointed out in my last lecture the cystic duct leaves the gall-bladder at an angle, and in the neck of the lumen returns on itself over a fold. If contraction of the gall-bladder forced this fold out against the opposite wall, it would form a flap-valve obstruction rather like that caused by an enlarged "middle lobe" of the prostate. There are three objections to this as a cause of gall-bladder dyskinesia: (1) that it gives no explanation of the hypertrophy of the ampulla muscle; (2) if the fundus of the gall-bladder is compressed by the fingers, the neck fills and distends as a whole, abolishing, rather than accentuating, the "flap-valve"; (3) if structural abnormality of the gall-bladder is responsible, its removal should cure the disease, but does not. Chiray and Pavel [14] attributed "spastic distension" to adhesions, and the same objections apply.[19] I have seen one case of what seemed to be "spastic distension" in which the pain was associated with the upright position and was resistant to treatment, which was possibly a case of Schmieden's kind, and Nuboer [34] has reported another.

The suggestion that the cause of ineffectual emptying of the gall-bladder is an excessive thickening and viscidity of the bile is unsatisfactory, because the bile from such cases is not as a rule at all viscid (see also [4]). The order of events is the other way round; the bile, if it is viscid, becomes so through excessive concentration because it stays in the gall-bladder too long. Other possible factors, such as corsets, sedentary life and diminished abdominal movements, constipation, ptosis, and so on have already been criticised out of existence by Lichtwitz[31] with great vigour, not to say venom, and also by Frigyesi [21] in a very moderate and completely destructive argument. The latter sums up by saying that the theory of neuromotor dyskinesia has made all the older theories pointless.

Are the symptoms in the biliary motility disorders all referable to the biliary system? There seems to be a fairly general association between these symptoms and gastric disorders, and some of the symptoms are certainly gastric. The nausea of spastic distension and the flatulence of atonic distension are of gastric origin, but similarly gastric symptoms are just as common in cases of gall-stones. *All* the symptoms of dyskinesia do not resemble those of stomach disease, and the treatment of the stomach alone does not cure the patient. The symptoms are of multiple origin, some gastric, some cardiac, some biliary, some colonic, all being part of a widespread disorder. Only treatment of each part of the disorder, or one treatment of the common cause can be expected to effect a cure. It is because we can attack the common factor that the treatment of spastic distension is so satisfactory.

The Extrahepatic Biliary System and Other Organs

From the point of view both of differential diagnosis and of pathology the relations between the extrahepatic biliary system and other diseased organs are of interest.

The stomach both affects and is affected by the gall-bladder. The hypochlorhydria of cholelithiasis and cholecystitis is well known,[33 40 44 50 30] but whether the function of the stomach is deranged by the gall-bladder disease, or whether the two go together constitutionally in the same person is not known. I think the work done on this association between the two organs is too crude; it is unlikely that diseases of all sorts will produce constant effects simply because they are diseases of the same organ; what is needed is information as to the relation between different sorts of diseases of the gall-bladder, and corresponding gastric abnormalities.

Gastric and duodenal ulcers may cause a reflex

TABLE II.—SPASTIC DISTENSION

Case.	Sex and age.	Build and costal angle.	Physical and mental.	Pain.	Nausea.	Vomiting.	Flatulence.	Bowels open per diem.	Appetite.	Jaundice.	Heart.	Ba. meal.	Gastric pressure— Resp.	Gastric pressure— Peris.	Gastric total acid. (c.cm. equiv.)	Gastric free HCl. (c.cm. equiv.)	Bilirubin in duodenal fluid.	Time between oil and bile flow.	Bilirubin— In "A" bile.	Bilirubin— In "B" bile.
													cm.	cm.			mg.*	min.	mg.*	mg.*
1	F37	Broad and strong. C.A. 120°	Athlete.	++ G.B. to scapula with cold and exhaustion.	0	0	Slight.	2	Fair.	Slight attacks reported.	Sinus arrhythmia.	—	0·25	0	58	20	4	15	4	36
2	F47	Broad. C.A. 90°	Ordinary.	++ G.B. to scapula.	+	Occas.	0	2–3	Good.	0	Normal.	Small, pyloro-spasm.	0	6	88	33	0	30	7·6	76
3	F28	Strong. C.A. 95°	Active.	Slight when tired.	+++	0	0	3	,,	Reported.	Extra-systoles.	—	—	—	—	—	—	—	—	—
4	M32	Strong. C.A. 90°	Athlete.	++ G.B. to scapula, at night.	+	Occas.	Little.	1–2	Poor.	0	,,	Small, rapid emptying.	0·5	5–12	85	56	Acid 0·5	22	5·5	42
5	F59	Heavily built.	Active and excitable.	Severe, G.B. area.	Little.	0	+++	0–1	,,	0	High B.P.	—	—	—	—	—	—	—	—	—
6	M34	Dysplastic. Sweating.	Energetic.	Distension p.c.	+	0	0	0–1	Fair.	Definite attack reported.	Normal.	Tonic, rapid emptying.	0	15	54	32	Acid 0	20	6·5	80
7	M36	Heavily built.	Nervous, fidgety.	Distension p.c. in evening and when tired.	++	Occas.	Little.	2	Poor.	0	Extra-systoles.	,,	0	20	72	32	0	24	—	56
8	F58	Good structure C.A. 80°. Sweating.	Vigorous.	++ Griping, to scapula.	+	0	0	2–3	Fair.	Reported.	,,	Small, rapid emptying.	0·5	10	84	28	Acid 1·5	18	3	96

EFFECT OF PILOCARPINE.—*Case* 1. General sympathetic symptoms. Increased bile flow, then stopped for 5 min. *Case* 2. Not given. *Case* 4. 75 sec. arrest, then increased flow. *Case* 6. Sympathetic symptoms and increased flow, then vagal symptoms and 2 min. pause. *Case* 7. Pause of 3 min. *Case* 8. Pause of 50 sec., then increased flow.

Resp. = respiration. Peris. = peristalsis. Occas. = occasional. * per 100 c.cm.

TABLE III.—ATONIC DISTENSION

9	F60	Fat. C.A. 80°	Lethargic.	+ G.B. and epigastrium.	0	0	++	Irregular.	Bad.	Definite attack reported.	Normal.	—	0·5	Nil.†	24	5	— Weakly acid.	18	10	20
10	F43	Long thin type. Wiry.	Migraine active.	Distension.	0	At start of meal occas.	++	,,	Good.	0	,,	—	1·5	0	5	0	5	20	—	23
11	F61	Fat. C.A. very narrow.	Nervous.	"Heavy pain." G.B., epigastrium.	0	In morning occas.	++	Fairly regular.	Bad.	0	,,	Large, atonic.	1·2	0	0	0	2	22	12	20
12	M31	Normal. C.A. 90°	Active.	Discomfort p.c. esp. G.B. area.	0	—	++	Irregular.	,,	0	Extra-systoles. Exercise tolerance poor.	Baggy, ptosed.	2·0	0	15	Less than 5	8·4	28	—	26

EFFECT OF PILOCARPINE.—*Cases* 11 *and* 12. Immediate increase. † 10 cm. on retching.

TABLE IV.—DUODENAL INTUBATION AFTER CHOLECYSTECTOMY

16	F44	Stout. C.A. 45°	Migraine. Miserable and neurotic.	Diffusely across epigastrium half hour after meal.	0	With migraine only.	+	Constipated.	Poor.	0	Nil.	Large ptosed flaccid stomach.	—	0	—	—	3·2	20	3·6	None.
17	F50	Strong. C.A. 90°	Very active.	++ Griping. G.B. to scapula at night.	++	0	++	2	Fair.	Definite attack reported.	,,	Small tonic rapid-emptying stomach.	—	20	36‡	0‡	2·5	5	4·0	,,
18	F46	Broad built, thin. C.A. 120°	Strenuous. Had been athletic.	++ G.B. to scapula.	+	0	0	2	Good.	0	Occasional extra-systoles.	Small rapid-emptying stomach.	—	12	48	26	3·0	15	3·5	,,

EFFECT OF PILOCARPINE.—*Cases* 16 *and* 17. Not given. *Case* 18, Flow stopped for 3 min. then increased as symptoms passed off.

NOTES.—*Case* 16. † No evidence of dyskinesia, *Cases* 17 *and* 18, Spastic distension, ‡ Contents from duodenum.

over-activity of the biliary mechanism,[22] just as they may cause disorder of motility throughout the alimentary canal.[4] The same is true of appendicitis and other organic diseases. The biliary dyskinesia in these instances is not likely to be diagnosed, and even if it is there is no need to treat it specially, as treatment of the primary cause will cure the reflex disorders to which it has given rise.

Inflammation of the duodenum experimentally interferes with the expulsion of bile,[15] and on both clinical and post-mortem evidence I believe that one type of so-called catarrhal jaundice is caused in this way.

Asthma is said to be associated with spasm of the ampulla,[47] but I have had no experience of this. *Cholecystitis* may lead to hypertrophy of the ampulla muscle, as has been reported,[22] and as I have found myself. *Pregnancy and menstruation*, because of their supposed association with gall-stones, have been much discussed in relation to biliary retention.[54 55] This, because of the separation of gynæcology and obstetrics from medicine, is a special problem, which I have had no opportunity of investigating personally, so I shall only deal with it briefly. The facts are: that there is general agreement that the symptoms of gall-stones commonly start in relation to pregnancy, that some women have hypercholesterolæmia during pregnancy, and that some of these have excess of cholesterol in the bile after delivery, and that "menstrual jaundice" has been known for over 60 years. It is said that during every pregnancy and every menstrual period there is an excessive excitability of the biliary apparatus, leading in many cases to some degree of spastic distension,[32 55] and although this has been denied [7] there is a tendency to substitute biliary dyskinesia for hypercholesterolæmia as the reason for the unquestionable predominance of gall-stones in women over men. The hypercholesterolæmia of menstruation is a fiction,[23 35 27 28 26] and that of pregnancy not nearly so common as was once supposed. What is important is that this vagal over-activity during pregnancy, if it is confirmed, would explain some of the attacks which seem to be due to gall-stones, as being attacks of spastic distension,[21] and that in cases of gall-stones this over-sensitivity of the vagus provides the reason for their giving rise to symptoms for the first time during pregnancy. It is a very important question and much needs investigation. The pressure of the pregnant uterus has no effect on the biliary apparatus,[17 32] and constipation is associated with dyskinesia because of the common innervation of the biliary tract and colon, not because constipation leads to the formation of scybalæ and these press on the bile-ducts.[21] This was foreseen with great perspicacity by Schmid in 1923.[46]

Gall-bladder and heart.—There are two aspects of the relationship between symptoms originating in these two organs which are of interest. Firstly, as Brooks [9] has said, we have all treated patients for gall-bladder disease who were really suffering from disease of the coronary arteries. Early progressive coronary occlusion may give a symptom picture which, in its precordial and epigastric pain, pallor, dyspepsia, and tenderness, closely simulates disease of the gall-bladder. One would not, a priori, think the mistake likely, but it is simply common experience that it is often made. The converse error is rarer. The typical picture of coronary occlusion is so characteristic that gall-bladder disease is not often mistaken for it, but angina is so familiar, both to the profession and the public, that any syndrome resembling it *may* be mistaken for it, especially if the patient has also a high blood pressure. One of my patients (No. 5) has the lurking fear that an attack she had in the past was angina. This differential diagnosis, between gall-bladder and coronary disease, ought to be better recognised, because it may be very difficult, and it is not a good thing to remove the gall-bladder from a patient with coronary occlusion. Points of assistance in making the differential diagnosis are these: (1) Remember that two diseases may be present at the same time, and that the over-active people who are liable to spastic distension are also liable to high blood pressure. (2) Do not accept a vague history of "pain," inquire carefully as to its site, nature, and duration. Inquire especially as to whether the pain came on suddenly during exertion, like angina, or gradually, after exertion, like biliary dyskinesia. (3) Observe the residual tenderness, this lasts for hours after an attack of angina, for days after an attack of gall-bladder disease.

The other aspect of the relationship between the two organs is the production of genuine cardiac disorders by gall-bladder disease. I have already mentioned the extrasystoles and sinus arrhythmia of spastic distension. Buchbinder [11] found in frogs that sudden alterations of pressure in the gall-bladder, experimentally, produced asystole and sinus bradycardia by a vagal reflex, which atropine and section of the vagus abolished. He thought that sudden pressure changes in the bile-ducts were also an adequate stimulus. Besides the arrhythmia, the electrocardiogram showed increase in amplitude of the R and an inversion of the T wave. Auricular fibrillation caused by cholecystitis has also been reported.[18 9] So there is no question that the heart can be reflexly influenced by the gall-bladder.

Besides the simple clinical features of biliary dyskinesia, a *rhino-pharyngeal syndrome* has been described by Campanacci and Pietrantoni.[13] These authors report cases of dryness of the pharynx, dry cough, dysphagia, &c., in the mornings and after meals, with neurasthenic symptoms, in association with various liver and gall-bladder diseases, including dyskinesia. Their patients seem to have been mostly alcoholics and syphilitics, which detracts rather from the necessarily cholecystic origin of the symptoms, but I was interested to find that one of my cases of spastic distension (No. 2) had come up to hospital, in the first instance to the ear, nose, and throat department, with symptoms which were strongly suspected of indicating tuberculous laryngitis, although nothing was ever proved (her after-history disproved any likelihood of this disease).

Other Descriptions of Dyskinesia

The reported cases of biliary dyskinesia are still few, unless there is an unexpectedly large body of material in two papers in very inaccessible journals which I have not read. The older literature, in which the possibility of such states was suspected, is scarcely applicable.

Kauffman [29] noted the importance of dyskinetic states and attributed them to "internal tetany." Chiray and Pavel [14] described the picture of dyskinesia, but attributed the hypertonic type to adhesions, &c., and considered only the atonic cases as functional in origin. Their treatment was correspondingly one-sided. Bronner [10] described the cholecystographic appearances in spastic and atonic cases, in the reflex irritability caused by gastric ulcer and the atony of old age. Bérard and Mallet-Guy [5] attributed the persistence of symptoms after cholecystectomy to "stasis," without recognising the cause. Westphal [53 55] gave the first general description of the different types of dyskinesia and their treatment, but without case details and with only scanty clinical information. All subsequent work has derived from this publication. Bufano [12] described a

TABLE V.—DUODENAL INTUBATION AND GALL-STONES

Case	Sex and age.	Notes.	Cholecystogram.	Gastric total acid.	Gastric HCl.	Bilirubin in duodenal fluid.	Bilirubin in—		Time: oil to "A" bile.	Microscopy of bile.
							"A" bile.	"B" bile.		
						mg.*	mg.*	mg.*	min.	
13	F 63	27 faceted stones at operation.	One small doubtful shadow. G.B. filled well.	15	0	? 2	? 2	20	14	Pus cells.
14	F 58	66 faceted stones at operation.	No evidence of stones. Poorly filling G.B.	12	0	1	5·8	34	8	Pus cells. Cholesterol crystals.
15	F 52	Valve stone in infundibulum.	Ring shadow of a combination stone. G.B. filled with dye.	24	0	2·5	2·8	None.	15	Nil.

* per 100 c.cm.

typical case of spastic distension and its cure; Rossi [42] gave a good clinical description of biliary dyskinesia in general, but did not differentiate it into two types. Savy,[45] in discussing the stimulation of gall-stones by other diseases, followed Westphal's ideas as to spasm causing the symptoms. He describes jaundice produced by the stimulus of duodenal intubation, a symptom I have never seen. Incidentally, a probable case of spastic distension, clinically, was described by Illingworth,[24] page 214, in a patient who was found to have a strawberry gall-bladder, a subject to which I shall refer later.

The reported cases, such as they are, correspond remarkably well to my own cases, and it is this correspondence which encourages me to give a general description of the clinical features of these disorders, on what would otherwise be too few cases to admit of generalisation.

Duodenal Intubation in Other Gall-bladder Abnormalities

Cholecystectomy.—The patient's symptoms are, as a rule, relieved by removal of the gall-bladder for cholecystitis, &c., and there is no call for further investigation. In such cases the ampulla and sphincter of the common bile-duct allow the bile to trickle away continuously into the duodenum. This state is reflected in the results of duodenal intubation, in that the duodenum is found to contain bile, and olive oil evokes only a slightly increased flow, of brief duration and of a rather greener colour, containing rather more bilirubin. This increase in bilirubin content may be due simply to the greater proportion of bile in relation to duodenal secretion. In some cases, however, one of two untoward effects may lead to reconsideration. The first is the failure of the wound to heal. A biliary fistula lasting a long while may remain after cholecystectomy if spasm of the ampulla forces the bile to take a line of less resistance. Secondly, after the pain attributable to the operation is over, patients not uncommonly experience a return of their original symptoms. These failures have been said to be due to cholangitis,[19] hepatitis,[36 16] or to failure of the ampulla and sphincter to adapt themselves to changed conditions.[33] Many such cases were actually suffering from spastic distension (with or without some other disease of the gall-bladder) before operation, and the persistence of the same state is responsible for the relapse of the illness (Table IV.). Of the three cases which have been sent to me for continued symptoms after cholecystectomy, two (Nos. 17 and 18) were typical of spastic distension, and one (No. 16) was a difficult and doubtful one, in which the possible biliary disorder was complicated, as in Case 10, by migraine. The clinical pictures can be followed from the Table. Duodenal intubation confirmed the diagnosis in the two spastic cases, and they both did extraordinarily well on treatment by diet and belladonna. The removal of the gall-bladder seems to have reduced the latent period between the administration of oil and the flow of bile.

Gall-stones and Cholecystitis.—It has been said that the gall-bladder never empties properly when it contains stones.[56] It depends, of course, on the kind of stone. There is no reason why pigment calcium stones should prevent the gall-bladder from emptying, and a cholesterol solitaire need not interfere so long as it lies in the fundus or body, but faceted stones, and the cholecystitis which accompanies them, might well impede the process (Table V.). In my two cases bile was obtained from the gall-bladder after a long latent period. Case 13 showed one tiny, very doubtful shadow in the cholecystogram, and the bile contained pus cells microscopically. On this evidence the gall-bladder was explored and found to contain 27 faceted stones. Case 14 showed no stones in X ray, and the gall-bladder shadow was very indefinite. The bile contained pus cells and a few cholesterol notched plate crystals. This patient was also operated on, and the gall-bladder contained 66 faceted stones. The history and signs in both these cases were suggestive of cholelithiasis. Case 15, from the point of view of cholecystitis, was different in that the bile contained no pus cells or crystals. A negative finding is not necessarily significant. This patient must have had cholecystitis in the past, because the X ray shows a stone whose centre is transparent, being composed only of cholesterol, round which has been deposited a layer of the mixed material of which inflammatory stones are formed (a combination stone). The other interest of this case is that it gives an example of the findings in a case of—

Valve Stone.—Cholesterol solitaires have so low a specific gravity that they are, of all stones, the most likely to float up into the neck of the gall-bladder and there become impacted, temporarily or permanently. The stone in this situation acts as a valve, allowing bile to enter the gall-bladder but not to leave it. For this reason cholecystography may give a good result; bile flows into the gall-bladder, is concentrated, and throws a shadow. But duodenal intubation usually gives a negative result; the peristalsis of the ampulla, evoked after a long latent period, causes a good flow of bile, but not being mixed with gall-bladder bile it remains as dilute as before. The gall-bladder is, in fact, excluded from the process. This finding, or a positive result with "B" bile on one occasion, and a negative result, without, on another, are characteristic of an intermittent valve stone in the neck of the gall-bladder.[1 55] In this form of cystic duct obstruction the gall-bladder is very liable to become inflamed, as it is after ligature of the cystic duct in animals,[2] and this cholecystitis is the cause of the inflammatory layer on the surface of the original cholesterol solitaire and of the secondary brood of faceted stones which often form simultaneously. It is not known for certain if this patient has faceted stones also;

she did so well on medicinal treatment (belladonna and cascara) that even the surgeon, who kindly saw her for me, did not consider that operation was necessary.

Ætiology of Biliary Dyskinesia

What is the cause of biliary dyskinesia? I do not know. What is the cause of hyper- or hypo-chlorhydric dyspepsia? One can only say with certainty that both questions are wrongly put. There is no one cause for any of these disorders. As Aschoff says, we must look for the factors determining a disorder, the "conditions" in the strict sense of the word, not a single cause. The presence of these disorders in the young suggests a constitutional factor. The Germans find them more commonly in young people, and stress this aspect. My cases, being mostly middle-aged, have not corresponded to theirs in this instance. The discrepancy may have something to do with differences between the two peoples. German girls acquire the solidity and matronliness, which we associated with early middle age, much sooner, at a time when English girls are still, to put it mildly, "young adults." That is certainly true of the past; things may be changing now, but the reports in the medical literature also refer, of course, to the past. In the older patients stress, physical and mental, irregular and hurried meals, and possibly over-appetising food appear to be contributory factors in over-stimulating the biliary part of the digestive tract as in over-stimulating the gastric part. Uninteresting, sodden food, mixtures of fats and starches, with either very hot or very cold drinks at meal times lead to atony of stomach, biliary system, and colon. None of my patients was hysterical (though of course hysteria might manifest itself in this way), and the disorders have nothing to do with anxiety neurosis, neurasthenia (or call it what you will) of the menopause. A biliary dyskinesia might be accentuated in the patient's consciousness by the menopause, but none of my patients has complained of occipital headaches, feelings of pressure on the vertex, tachycardia, or precordial pains or fears. It has been stated that all biliary dyskinetics have headaches,[42] this, so far as my cases were concerned, is entirely untrue. All this must be stated explicitly, because there have been signs recently of a movement to hold the gall-bladder responsible for these menopausal symptoms, just as the colon and mobile kidney have been blamed in the past. I should very much dislike to be associated with any attempt to attribute the menopausal anxiety neurosis to a crude organic basis.

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TREATMENT OF PUERPERAL SEPTICÆMIA WITH ANTITOXIC SERUM

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This investigation is an attempt to assess the therapeutic value of antitoxic serum in puerperal septicæmia due to infection with *Streptococcus hæmolyticus*. During a period of six years 114 cases have been studied.

The scarcity of literature dealing with the antitoxic serum treatment of puerperal septicæmia is in striking contrast to the flood of favourable reports which followed the introduction of this serum in the therapy of scarlet fever.

The fatality-rate in blood infections with *S. hæmolyticus* may be regarded as at least 70 per cent. In a group of 53 proven bacteriological cases of streptococcal puerperal septicæmia studied by a London committee [1] 66 per cent. died. There was no evidence that a hæmolytic streptococcus was incriminated in all cases. Kinloch [2] reports 22 deaths (78·6 per cent.) in 28 cases of puerperal infection in which *S. hæmolyticus* was cultured from the blood during life. Fromme [3] records 10 cases of puerperal septicæmia with hæmolytic streptococci present in the blood; 9 died. In a series of 8 cases with positive blood

culture observed by Rankin [4] only 1 recovered. The mortality of 29·6 per cent. recorded by Burt-White [5] in a series of 27 cases of puerperal septicæmia, in all of which hæmolytic streptococci had been cultured from the blood, is thus very striking. Including 3 cases treated after completion of his paper, all of which died, the fatality-rate rises to 36·7 per cent. in a series of 30 patients. Sanderson [6] reports two cases of hæmolytic streptococcal septicæmia, one following puerperal infection, in which the administration of scarlatinal antitoxic serum appeared to effect a cure. Favourable results were obtained by Rosher [7] in four cases of hæmolytic streptococcal septicæmia following the subcutaneous or intramuscular injection of relatively small doses of scarlet fever antitoxin; two were puerperal infections. Several clinicians with an extensive experience of serum treatment in puerperal sepsis have not been so fortunate as Burt-White. Sutherland [8] has stated that the use of antitoxic serum had been given up at the Monsall Hospital. In a personal communication, Smith, of the City Hospital, Aberdeen, states: "The results obtained when cases of streptococcal puerperal septicæmia were treated with scarlet and puerperal antitoxin were so disappointing that their use was abandoned. . . . We do not even give any variety of streptococcal antitoxin to cases with localised streptococcal uterine infection." Whilst impressed with the prophylactic value of scarlet fever antitoxin, Archibald, of Belvidere Fever Hospital, Glasgow, informs us that the results obtained in the treatment of streptococcal puerperal septicæmia have been very disappointing. Reid, of the County Hospital, Motherwell, replies in equally pessimistic vein regarding the value of antitoxic serum in cases with positive blood culture.

The limited but very definite value of serum treatment in scarlet fever noted by Benson [9] and corroborated by Craig [10] in a series of 500 controlled cases led to the use of streptococcal antitoxin in puerperal sepsis and erysipelas. It was realised, however, that in these infections the pyogenic and invasive properties of the hæmolytic streptococcus present a very different therapeutic problem to the relatively simple neutralisation of exotoxin which gives such satisfactory results in scarlatina.

The experimental findings of Parish and Okell [11] are of interest. These observers noted that the intravenous injection of an adequate amount of scarlet fever antitoxin exercised a very definite beneficial effect in the rapidly fatal hæmolytic streptococcal septicæmia of rabbits. It is important to note, however, that the serum was injected four to six hours prior to the experimentally produced blood infection.

SCHEME OF INVESTIGATION

The clinical diagnosis of septicæmia was confirmed in each of the 114 cases under review by the isolation of β-hæmolytic streptococci in pure culture from the blood during life. Uterine cultures were examined in 88 patients; 82 showed the presence of β-hæmolytic streptococci. It may be justly remarked that it is impossible to carry out a scientifically controlled investigation of the value of any method of treatment in puerperal septicæmia. Nevertheless by careful attention to age-periods, parity, and day of illness on which the patient first came under hospital treatment, certain fallacies may be avoided. To exclude possible variations in the virulence of the infecting streptococcus a control case was selected for each serum-treated patient as far as possible in the same year. Cases of infection following abortion, and depressing factors such as undue loss of blood, prolonged labour, and gross local trauma, have been fairly equally distributed in the two groups. Inherent resistance to infection is impossible to gauge. By the application of these principles the results obtained in the 57 serum-treated patients may be regarded as reasonably comparable to the findings in the 57 cases which did not receive serum. Table I. shows that the proportions of primiparæ and multiparæ in each group agree closely.

TABLE I.—*Age and Parity*

Age-period in years—		15–19	20–29	30–39	40 +	Totals.
Serum treated cases	Primipara ..	0	16	5	0	21
	Multipara ..	0	8	24	4	36
Control cases	Primipara ..	1	13	6	2	22
	Multipara ..	0	15	18	2	35

In the serum-treated series 58 per cent. are above 30 years of age as compared with 50 per cent. in the control group. A study of 416 cases of puerperal infection admitted to the City Hospital reveals that the chance of recovery of multiparæ or of patients over 30 years of age is approximately half that of primiparæ or of those under 30.

The two groups are closely comparable as regards the duration of illness prior to admission to hospital (Table II.).

TABLE II.—*Duration of Illness*

Stage of illness on patient's admission.	1st week.		2nd week.	3rd week.	4th week or later.
	1st to 3rd day.	4th to 7th day.			
Serum-treated cases	16	27	10	0	4
Control cases ..	17	22	10	2	6

Bacteriology.—Five cubic centimetres of blood from a vein were inoculated into 15 c.cm. of trypsin-broth (Allen and Hanbury). The blood culture was incubated for four days at 37° C. and examined daily. Subcultures were made on human blood-agar plates and incubated for 24 hours. Streptococci were identified by their colony and microscopic appearances. Typical colonies were picked off and inoculated into cultures of peptone water serum agar containing litmus, lactose, mannite, and salicin. The fermentation reactions of *S. pyogenes* were obtained.

The uterine swab was immediately stroked over a human blood-agar plate which was incubated for 18 hours. The small, round, dewdrop colonies, each surrounded by a sharply defined circular clear zone of hæmolysis, 2 to 4 mm. in diameter, were easily identified.

SERUM TREATMENT AND ITS RESULTS

Puerperal antistreptococcus serum (Burroughs Wellcome and Co.) was administered to 20 patients; concentrated streptococcus antitoxin, scarlatina (B. W. and Co.) was used in 37 cases. The intravenous route was adopted in 24 individuals; in 18 cases serum was injected both intravenously and intramuscularly; the intramuscular route was employed in 15 cases. For intravenous injection 40 c.cm. of

TABLE III.—*Serum Dosage*

Group.	Total dose of serum in c.cm.	Cases.
A.	10– 50	18
B.	51–100	15
C.	101–200	16
D.	201–300	6
E.	301–400	2

serum were diluted with one pint of saline. The total dose of serum varied from 10 to 330 c.cm. Details of serum dosage are given in Table III.

Fourteen cases in Group A received 40 to 50 c.cm. of serum; 100 c.cm. of serum were administered to 13 cases in Group B. A sharp immediate reaction followed intravenous injection in many patients; no serum fatalities occurred. Rashes, joint pains, and other manifestations of the serum disease gave rise to considerable discomfort in one-quarter of the patients who survived more than a week. Adrenaline was invariably injected with the serum.

The acid test of the value of serum in hæmolytic streptococcal septicæmia lies in its power to prevent a fatal issue.

TABLE IV.—*Fatality-rate in Serum-treated Patients*

Day of disease serum first administered.	Cases	Recovered.	Died.	Fatality per cent.	Average dose of serum in c.cm.		
					I.V.	I.M.	Total
First ..	7	2	5	70	60(5)	60(6)	120
Second ..	9	3	6				
Third ..	9	1	8*	—	60(6)	94(5)	100
Fourth or later ..	32	8	24	75	94(9)	78(3)	120
Totals ..	57	14	43	—	74(20)	104(19)	109

* Three patients died within 48 hours of admission to hospital. Figures in parentheses indicate number of patients who received injection by the particular route.

Table IV. shows that the fatality-rate in 57 patients treated with serum was 75 per cent. A study of this Table indicates that the high death-rate cannot be explained by undue delay in the administration of serum. Of 7 cases which received serum, 5 intravenously, within a few hours of the onset of symptoms 5 died. In 16 patients serum treatment was commenced within 48 hours of the onset of symptoms; the fatality-rate in this group was 70 per cent. Many of these patients received their initial serum injections at a maternity hospital prior to being transferred to our care.

TABLE V.—*Fatality-rate in Serum-treated and Control Series*

—	Total cases.	Recovered.	Died.	Mortality per cent.
Serum-treated cases	57	14	43	75
Control cases ..	57	18	39	68
Totals ..	114	32	82	72

Various factors may account for the higher fatality-rate (not statistically significant) in the serum-treated series (Table V.). Three patients died within 48 hours of admission to hospital. As the total duration of illness did not exceed five days in any one of these cases the infection may be regarded as having been unusually severe. No deaths within 48 hours of admission were noted in the control series. In the earlier years of this investigation it was difficult to maintain a strictly impartial attitude and thus, merely for the purpose of collecting control cases, deny patients who were obviously gravely ill the hypothetical advantages of serum treatment.

In several patients temporary improvement followed the injection of serum; in a few serum therapy may have prolonged the agony; in many no therapeutic effect could be ascertained. Figs. 1 and 2 show little indication of a specific curative effect. All the evidence suggests that the few recoveries which followed serum treatment might be regarded as *post hoc* rather than *propter hoc*.

TREATMENT OF CONTROL CASES

Nineteen patients were treated on general lines only; of these 13 died (68 per cent.). Special therapeutic measures were tried in 38 cases (Table VI.).

TABLE VI.—*Treatment of Control Cases*

—	Total cases.	Recovered	Died.	Mortality per cent.	—	Total cases.	Recovered	Died.
General measures	19	6	13	68	Adexolin ..	2	0	2
10% glucose-saline and collosol iodine (I.V.)					Strepto-Yatren (I.V.)	2	1	1
insulin (subcut.) ..	22	9	13	60	Arsenicals (I.V.) ..	2	0	2
Nucleic acid and sod. salicylate (I.M.).. ..	3	0	3	—	Mercuro-chrome (I.V.)	1	0	1
Proflavine (I.V.)	2	2	0	—	Collosol manganese (I.M.) ..	1	0	1
Blood transfusion ..	2	0	2	—	Quin. bihydrochloride (I.M.) ..	1	0	1

I.V. = intravenous. I.M. = intramuscular.

For the past two years we have relied upon the daily intravenous injection of one to two pints of a 10 per cent. solution of glucose in saline, each pint accompanied by a subcutaneous injection of 20 units of insulin; most patients have in addition received 20 c.cm. of collosol iodine daily by the intravenous route; 22 cases treated in this manner show a recovery-rate of 40 per cent. Intravenous injection of dextrose is advocated by Wheeler,[12] Küstner,[13] and Polak.[14]

Whilst in our experience the massive transfusion of whole blood has proved disappointing, the method of repeated small transfusions, preferably of serum, which has given such excellent results in the hands of Cadham,[15] deserves a more extended trial. This treatment aims at the activation of complement. We have not been impressed by chemotherapy. Eusol, quinine, iodine, mercurochrome, collosol argentum, collosol manganese, various dyes, novarsenobillon and other salvarsan equivalents have all been tried. Our results indicate that the

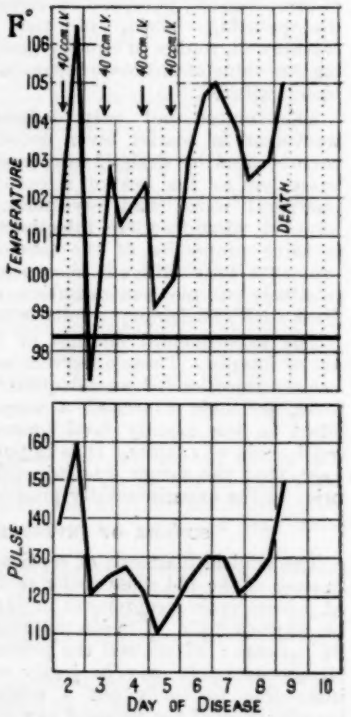

FIG. 1.—Patient aged 28; 3-para. Normal full-time labour. Received four daily intravenous injections of 40 c.cm. concentrated streptococcal antitoxin (scarlatina).

search for a *therapia sterilisans magna* has not yet been successful.

DISCUSSION

It is difficult to reconcile the poor results recorded in this investigation with the figures published by Burt-White. There is general agreement that the more recent preparations of antistreptococcal serum are almost entirely antitoxic in nature. From the clinician's point of view there is no satisfactory

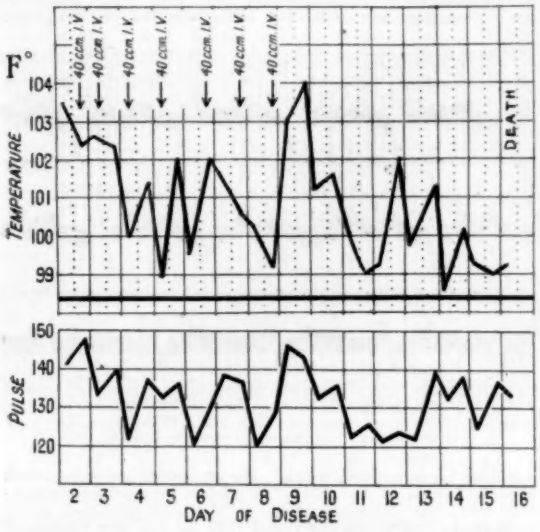

FIG. 2.—Patient aged 35; 6-para. Normal full-time labour. Received seven daily intravenous injections of concentrated streptococcal antitoxin (scarlatina).

evidence that an antistreptococcal serum with demonstrable antibacterial or anti-endotoxic properties has yet been produced. This defect is obvious in the serum therapy of scarlet fever. In erysipelas we have noted continued spread in spite of repeated injections of streptococcal antitoxic serum. A dramatic response occasionally follows the administration of serum to patients who show the clinical signs of blood infection arising from a local streptococcal lesion. By chance the serum employed may have antibacterial properties against the particular infecting strain. On the other hand the favourable outcome may be entirely due to a non-specific effect or else merely a coincidence.

The results obtained by Cameron [16] suggest that the administration of streptococcal antitoxic serum is of value in the prophylaxis of puerperal infection. The protective effect may again be purely non-specific.

It has been stated that where there is even a remote possibility of serum effecting a cure it should be used as a routine. Our results indicate that the exhibition of serum as a therapeutic agent in streptococcal puerperal septicæmia is useless. There are two good reasons why the administration of serum *faute de mieux* should be discontinued: (1) The intravenous injection of serum occasionally causes severe immediate distress to the patient, and is followed in at least 20 per cent. of adults by several days of misery in the form of serum sickness. (2) In doses of 200 c.cm. or more per patient serum becomes an expensive item. The expenditure on serum for the 57 patients in this series amounted to nearly £300. Where no obvious return is obtained, the money, more particularly in these times of economic stress, might be more profitably spent.

The rare cases of puerperal scarlet fever form an exception. Where uterine infection with hæmolytic streptococci is accompanied by a scarlatiniform rash giving a positive Schultz-Charlton reaction, 30 c.cm. of scarlet fever antitoxic serum diluted with glucose saline should be injected intravenously. In a recent case of this type two intravenous doses of 30 c.cm. of scarlet fever antitoxin caused a prompt disappearance of the rash and temporary alleviation of constitutional symptoms; nevertheless death occurred one week later from an extensive pyogenic and invasive action of the hæmolytic streptococcus.

SUMMARY AND CONCLUSIONS

One hundred and fourteen cases of puerperal septicæmia have been studied. The clinical diagnosis was verified by the cultivation of β-hæmolytic streptococci from the blood.

Fifty-seven patients were treated by intravenous (24), intramuscular (15), or combined (18) injections of serum. Puerperal antistreptococcus serum (B. W. and Co.) was administered to 20 cases; concentrated streptococcus antitoxin, scarlatina (B. W. and Co.), to the remaining 37 patients. In 37 cases the total dose of serum varied from 100 to 330 c.cm.; 57 patients treated by various measures other than serum acted as controls.

The fatality-rate in the serum-treated series was 75 per cent., as compared with 68 per cent. in the control series. The fatality-rate for 114 cases was 72 per cent.

There is no evidence that streptococcal antitoxic serum is of value in the treatment of puerperal septicæmia due to infection with the hæmolytic streptococcus. The rare cases of puerperal scarlet fever form an exception. Owing to the unpleasant reactions that commonly occur, particularly following intravenous injection, the practice of exhibiting serum *faute de mieux* should be discontinued. We are of the opinion that a cure for hæmolytic streptococcal puerperal septicæmia has still to be discovered.

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EAST HAM HOSPITAL.—For the first time the income of this hospital, £19,859, has exceeded the expenditure, the credit balance being £870. There is still, however, a debt exceeding £19,000. There were 1550 in-patients whose average stay was 21·6 days. Out-patients were 166 per cent. more numerous than in 1929.

WALSALL MANOR HOSPITAL.—Dr. E. S. Clayton, the resident medical officer of this public assistance hospital, draws the attention of the authority to the lack of accommodation for mental patients, and points out the undesirability of their presence in the wards. He regards a separate building as necessary. The work of the hospital has greatly increased, admissions having risen from 980 in 1928 to 2723 in 1932. It is difficult to classify patients owing to the limitations of the building, and the pressure on the maternity department is indicated by the fact that although there are only seven beds there were 148 births.

BILATERAL OBLITERATION OF RADIAL AND CAROTID PULSES IN AORTIC ANEURYSM

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A case of bilateral obliteration of the radial and carotid pulses in aortic aneurysm was reported by Kampmeier and Neumann[1] in 1930, at which time they were able to collect only three similar cases from the literature. Hare and Holder,[2] in 1899, analysing 953 cases of aortic aneurysm with special reference to pulse abnormalities, found that only 32 out of 784 cases of aneurysm of the aortic arch presented any pulse abnormality at all, and in only five of these was there complete absence of the radial pulse on one side. In no case they recorded, nor in the series of 4000 reports on aortic aneurysm collected and reviewed by Boyd[3] in 1924, was there bilateral absence of the pulse. The case reported adds a further example of this condition to the scanty records available, and is of importance in so far as the pathological findings associated therewith appear to be unique.

CASE REPORT

The patient, a married man, a decorator, aged 60, with two children, is said to have fallen from a roof in 1915 and injured his chest. The details elicited suggest that this was a minor injury, and he was able to work satisfactorily for 12 months after this accident. In 1918 he began to complain of headache and fainting attacks, and it was observed that his eyes were bloodshot. About this time he suddenly lost the sight of his left eye (said to be due to a "burst blood-vessel") and cataract followed. This immediately preceded a period of delirium which lasted two to three days, and from which he gradually emerged. From this time he was unable to carry out manual work, and became subject to occasional "fainting attacks," which recurred at two- to three-monthly intervals and lasted five to eight minutes; no symptoms suggesting an epileptiform basis for the attacks were elicited, and there was no preceding aura; the loss of consciousness appeared to be associated with syncope.

On Nov. 4th, 1929, one of us (H. C.) saw him, in consultation with Dr. Basil Ward of Wallasey, at his own home, and confined to bed with well-marked evidence of cardiac failure. Examination revealed a normal fundamental cardiac rhythm; there was neither visible nor palpable aortic pulsation; the left border of the heart was 5 in. to the left of the midline in the sixth interspace, and the cardiac dullness was continuous with an extensive area of dullness over the manubrium sterni though, owing to well-marked emphysema, its exact limits were not defined; the heart sounds were distant, and a loud aortic systolic bruit and slight but definite systolic thrill were present. The three most striking features, however, were (1) the absence of both radial and both carotid pulses; (2) the presence over the chest, upper abdomen, and scapular regions of numerous small pulsating subcutaneous arteries; and (3) a blood pressure in the lower limbs of 210 mm. Hg systolic, while in the arms the maximum blood pressure recorded by oscillation was 40 to 50 mm. Hg. There was slight œdema in the lumbosacral area, evidence of congestion at both bases, and slight albuminuria, but no casts. No tracheal tug and no clubbing of the fingers were found. There was no evidence of organic nervous disease; owing to the cataract in the left eye the fundal details were obscured, though there was well-marked retinal arterio-sclerosis on the right side.

A few days later he became delirious again, and was transferred to an institution on Nov. 12th, 1929, where on two occasions his maniacal outbursts led to his being confined to a padded room. He improved, however, and was discharged on Jan. 10th, 1930, when his doctor reported: "In bed, but condition, both mental and physical, much improved; pulse always rapid (120 to 130 per minute)." Troublesome croupy cough developed about March, 1930; this was unrelieved by the usual measures; there was no complaint of pain.

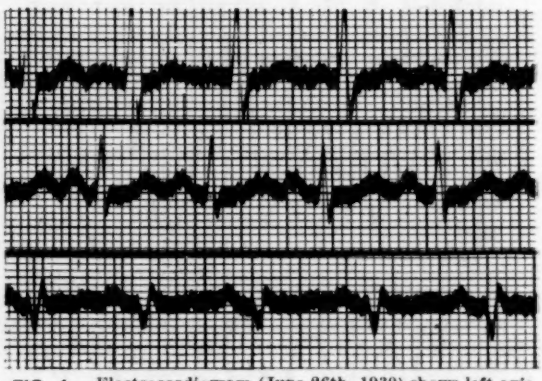

FIG. 1.—Electrocardiogram (June 26th, 1930) shows left axis deviation; fundamental rhythm normal.

On June 26th, 1930, he was seen again in consultation. Although the œdema was more marked the physical signs in the chest remained the same. Eight weeks before his re-examination he had developed hoarseness, which was found to be associated with paralysis of the left vocal cord. A Wassermann test was at this time strongly positive, and radioscopy of the chest confirmed the clinical diagnosis of aortic aneurysm, but showed no evidence of rib erosion by enlarged intercostal arteries. An electrocardiogram (Fig. 1) showed a fundamental normal rhythm: slight left axis deviation, but no other significant change. His only complaint was occasional dizziness; there had been no recurrence of his fainting attacks; his memory was good, and he was walking well. On July 19th, 1930, however, his doctor reported that he was "much worse, with an irregular, very rapid pulse, persistent laryngeal cough, and aphonia; he was having frequent attacks of severe dyspnœa with marked cyanosis, lasting sometimes 1½ hours; at times there was well-marked mental irritability." A fortnight before his death on August 12th, 1930, "all symptoms became aggravated; in addition, the urine became scanty and was sometimes suppressed for as long as 24 hours; it was high-coloured and very albuminous. In the last week of his life abdominal distension was marked; dyspnœa was constant, and attacks of cyanosis were more pronounced; 24 hours before death there developed a progressive paresis of the left arm, which had developed into a complete left hemiplegia just before the end."

POST-MORTEM FINDINGS

The post-mortem examination was carried out under conditions which made a full examination and the preservation of important organs and tissues very

difficult. The following, however, are the important features of the macroscopic examination.

The heart was considerably enlarged, with marked left ventricular hypertrophy. The aortic valves were thickened but not deformed, and appeared to be competent. The whole of the aortic arch was surrounded by a large amount of fibrous tissue, which also formed firm adhesions to the roots of both lungs, and to the trachea, œsophagus, and vertebral column. The aorta itself, from immediately above the aortic valve to the commencement of the descending portion of the arch, was greatly dilated, presenting an irregularly fusiform aneurysm (Fig. 2). Within this sac the intimal surface was almost entirely occupied by puckered scars and by atheromatous plaques and ulcers, except in that part of the transverse arch which overlay the trachea. Here the aortic wall was replaced by adventitial tissue, thick at the sides and almost deficient over the trachea itself, which was covered by a thin layer of fairly recently formed clot. The clot was readily detached, and it was seen that the wall of the "sac" was here constituted by the anterior wall of the trachea, the cartilaginous rings of which were laid bare.

The orifices of the three large vessels arising from the aortic arch were completely obliterated, their sites being represented merely by two shallow depressions. The portions of the aorta bearing the roots of these vessels had been detached from the arch at the time of the autopsy, and they are thus not seen in Fig. 2. In Fig. 3, however, these vessels are shown with their pieces of attached aortic wall, on which the depressions referred to can be distinctly seen. The depression marking the orifice of the innominate artery was somewhat deeper than that over the combined orifices of the left common carotid and left subclavian arteries. In each case, within the depression was a small irregular pit, which admitted a stout bristle for 1 to 2 mm. These pits seemed to be the last remnants of the arterial orifices. The lumina of the vessels, which appeared flabby and collapsed, were completely obliterated by firm connective tissue for about an inch, and partially obliterated for another similar distance beyond this.

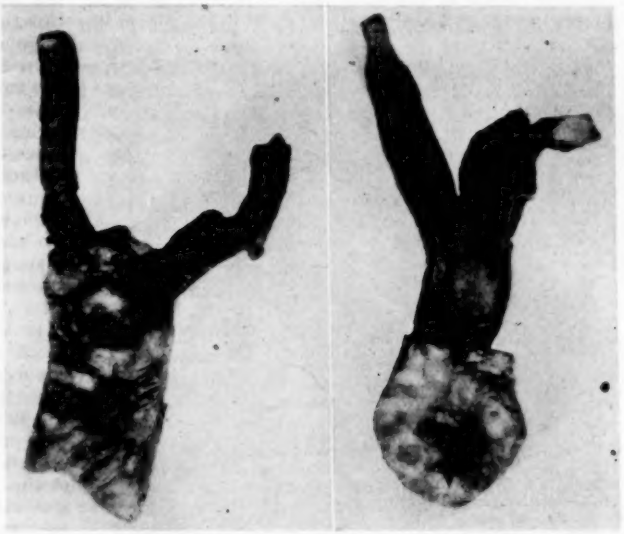

FIG. 3.—Occluded aortic orifices of the three main arterial trunks supplying the head, neck, and arms. The shallow depressions and the small pits in these depressions (see text) are seen to better advantage in the case of the left carotid and left subclavian arteries (on the left) than in the case of the innominate artery (on the right).

In view of this complete occlusion of all the large arterial trunks which normally carry blood to the head, neck, and arms, it would have been interesting and valuable to determine by careful dissection the part played by each of the possible channels of anastomosis. Such a detailed dissection of the anastomoses between the aortic intercostal arteries on the one hand and the vertebral, transverse cervical, and internal mammary (for head and neck), or the subscapular, long thoracic, superior intercostal, and thoracic axis (for the arms) on the other hand, would have been difficult to perform even in the ample time usually available for a post-mortem examination in a hospital, and became an impossibility under the conditions prevailing in this case. The only feature noted was that the internal mammary artery was definitely enlarged.

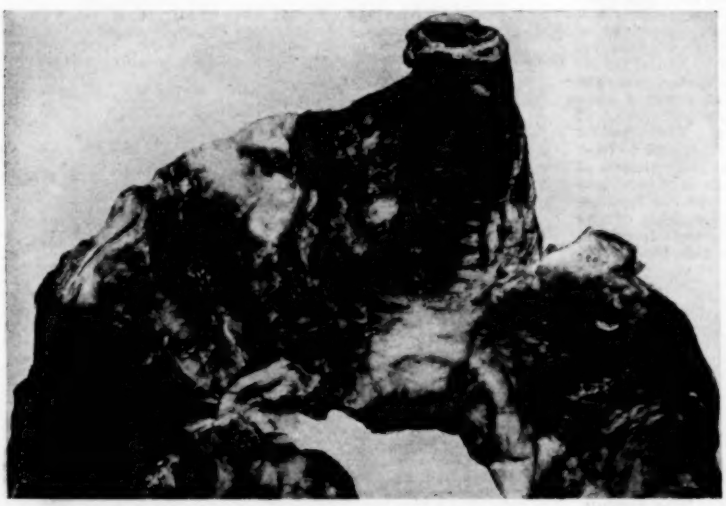

FIG. 2.—Posterior wall of the aneurysmal sac, showing defect in aortic wall over the trachea and the exposed cartilaginous rings of this.

MICROSCOPICAL FEATURES

The histological examination of the aorta and occluded vessels was carried out on sections stained by (*a*) hæmatoxylin and eosin, (*b*) hæmatoxylin and van Gieson, (*c*) orcein, (*d*) Verhoëff's elastic stain, (*e*) Heidenhain's hæmatoxylin and erythrosin, and (*f*) Levaditi's stain.

Various portions of the aortic wall forming part of the sac showed different degrees of disorganisation. In some, no evidence of the original media could be found, the sac wall consisting of a hyalinised mass with a thick connective tissue covering externally, formed by proliferation of the adventitia. Where the media was still distinguishable the evidence of the syphilitic basis of the aneurysm was traceable in the perivascular sleeves of lymphocytes surrounding the vasa vasorum in the adventitia, and by collections of lymphocytes with a small admixture of plasma cells within the muscular coat. In places these collections of cells almost assumed the form of miliary gummata. The intimal surface in all the sections cut showed the hyalinised and necrotic changes of atheroma, many of these areas showing calcification as well. In none of the lymphocytic collections were any giant cell systems seen, and the Levaditi preparations failed to show any spirochætes.

A transverse section through the completely occluded portion of the left common carotid artery is shown in Fig. 4. The collapsed appearance of the artery is illustrated by this microphotograph. The lumen is entirely occupied by homogeneous firm connective tissue, which resembles the connective tissue of the subintimal layer from which it appears to have proliferated. It is similar in appearance to

FIG. 4.—Transverse section of the left common carotid artery to show collapsed condition and complete obliteration of the lumen. (× 10).

the tissue seen within the lumen of old-standing cases of advanced endarteritis obliterans, and bears no resemblance to an organised thrombus in a vessel. In this section it is almost avascular, and consists of a delicate network of fibrils and elongated cells arranged roughly in a concentric pattern. There are no coarse bundles of collagen, though the whole of it stained a definite pink with van Gieson's stain. There is no hyalinisation of the fibrillar element at this level.

In Fig. 5 is shown a section cut in the plane of the lumen of the vessel at its point of origin from the aorta. The same tissue is seen obliterating the lumen, but here there is a moderate amount of vascularisation, several collections of thin-walled vessels being present just above the aortic level and again near the upper line of transection. At the actual level of the aortic orifice of the vessel a considerable amount of hyalinisation and a small amount of calcification have taken place, and here the appearances suggest the spread of an atheromatous plaque across the orifice. The lines of emergence of the elastic tissue from the aortic media to that of the vessel indicate that there has been no constriction of the orifice by the contraction of fibrous tissue. The relations of the various elements discussed are seen to better advantage in the drawing shown in Fig. 6, where the defects of the microphotograph of a single section are corrected from the picture provided by a series of sections from this block.

Only in two of the recorded cases was a post-mortem examination performed. In the first, recorded by Broadbent [4] in 1875, the absence of both radial pulses and of the right carotid pulse was accounted for by a plaque of atheroma almost completely obliterating the orifice of the innominate artery, which was unusually close to the left common carotid artery; while an abnormal vertebral artery, arising directly from the aortic arch, encroached on the orifice of the left subclavian artery which, too, was further narrowed by a small plaque of atheroma. The vessels above their constricted orifices were normal in structure and calibre. It is to be noted that the lesion was not a single one, but a repetition of similar lesions at two separate points, and that no aneurysm was present.

The second case, recorded by Shikhare,[5] was of a different type. Here the absence of the pulses was the result of the almost complete obliteration of the lumina of the large vessels arising from the aortic arch by ante-mortem thrombus. The arch of the aorta was represented by a fusiform aneurysmal dilatation which was filled with ante-mortem thrombus, except for a narrow passage posteriorly, and from this thrombus finger-like processes passed up into the large arterial trunks.

In the absence of a post-mortem examination on the two remaining cases—viz., that of Crawford [6] and Kampmeier and Neumann's own case—the pathological basis for the obliteration of the pulses must necessarily remain a matter of conjecture or, at best, deduction. It is suggested by Kampmeier and Neumann that in Crawford's case the effect was probably produced by pressure on the arterial trunks by the enlarging aneurysmal sac. They further premise that in their own case this, in all probability, accounted for the obliteration of the pulse on the right side.

It will be noted that in none of these cases is there any mention of an overgrowth of subintimal connective tissue. In our case this appears to have been the cause of the obliteration of the lumina of the first part of the arterial trunks concerned. It does not necessarily follow that this process of proliferation was the primary factor in the development of the condition. In fact, having regard to the extensive atheromatous lesions present in the aneurysmal sac, and with Broadbent's case as a precedent, we incline to the view that the subintimal connective tissue proliferation followed, or at most developed pari passu with, atheromatous narrowing of the arterial orifices. The absence of a similar obliterative proliferation of connective tissue in Broadbent's case is probably associated with its non-syphilitic basis. Such syphilitic endarteritis obliterans is admittedly rare in large arteries; but it is, we venture to suggest, possible that subsequent to the marked narrowing of the orifices of the vessels by plaques of associated atheroma, the tendency to proliferation of the subintimal connective tissue, manifested in small

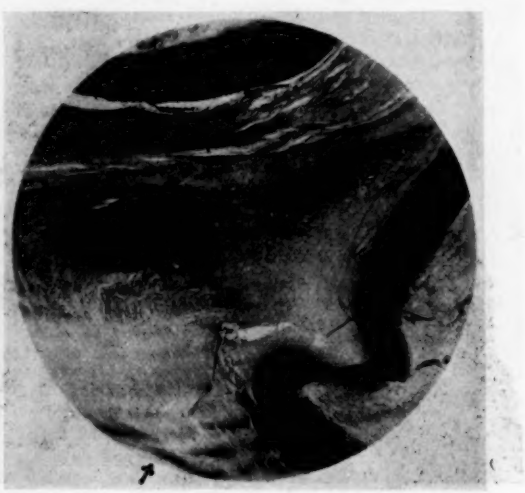

FIG. 5.—Section in plane of lumen of occluded artery at level of origin from aorta. The aortic lumen is just included below (arrow). (× 12.)

arteries involved in syphilitic lesions, may here too have become active. This suggestion will remain unproven until more such cases at intermediate stages of development of the condition have been discovered and described.

SUMMARY

(1) The case is one of aortic aneurysm associated with bilateral obliteration of radial and carotid pulses. (2) Reports of four similar cases, in two of which post-mortem examinations were carried out, have been found. (3) The obstructive factor responsible for pulse obliteration varied in all three cases examined at autopsy, being (*a*) atheromatous plaque obstructing the orifices of the great vessels; (*b*) ante-mortem thrombus, projecting from aneurysmal sac into the great vessels; and (*c*) subintimal proliferation in the innominate, left subclavian, and carotid arteries. (4) In all cases the dominant clinical picture was cerebral.

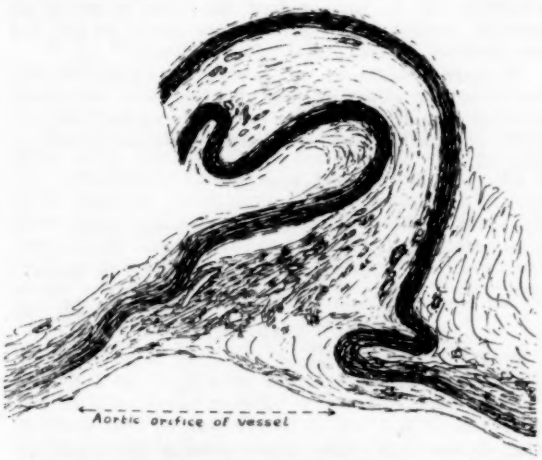

FIG. 6.—Drawing of section of artery in plane of lumen at level of its aortic orifice. (× 6).

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THE KETOGENIC DIET

NATURE OF THE BACTERICIDAL AGENT

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IN 1931 H. F. Helmholz and A. L. Clark [1] introduced the ketogenic diet treatment of pyelitis. There is no doubt that sterilisation of the urine can frequently be obtained by this method in a few days, provided that a sufficiently intense ketosis is produced. Helmholz, Dick, and others have shown that the diet produces some change in the urine which makes it inhibit the growth of bacteria, but they failed to discover the precise manner in which the urine acts. The ketogenic diet causes the excretion of a urine which is more acid than normally, and which contains acetone bodies. All observers agree that the change in reaction of the urine is not the only factor causing inhibition of growth. Ketonic urine inhibits the growth of *B. coli* to a much greater extent than normal urine rendered acid to the same degree by the use of acidifying salts. Clark [2] expressed the opinion that the growth-inhibiting effect was not solely due to the acidity of the urine, but that some bactericidal substance was excreted; and Dick [3] expressed similar views. Helmholz [4] concluded that acidity was an important, but not the sole factor, and that some substance other than acetoacetic acid was the active agent.

During the past eight months the diet has been given to some 40 patients at the isolation block of Queen Charlotte's Hospital, most of whom had a heavy urinary infection by *B. coli* or allied organisms. The clinical results (which have been very satisfactory), together with details of the diet employed, will be separately reported in the near future. In the present communication I shall summarise experimental work carried out in connexion with these cases which has led to the conclusion that the excretion of β-oxybutyric acid is primarily responsible for the rapid elimination of organisms from the urinary tract during ketosis.

PLAN OF THE INVESTIGATION

1. Routine estiminations of the pH, the acetoacetic acid excretion, and the *B. coli*-inhibiting power were carried out at frequent intervals on a number of patients under treatment.

The *B. coli*-inhibiting power (bacteriostatic test) was determined by implanting a measured volume of a *B. coli* culture into 3 c.cm. of filtered urine. A 10 c.mm. sample was explanted into nutrient agar immediately after mixing, and again after 5 hours and after 20 hours at 37° C. The growth ratios at 5 hours and at 20 hours were determined by dividing the number of colonies obtained from these latter samples by that obtained from the first sample.

The determinations of acetoacetic acid were made using my adaptation of the Rothera test, which yields roughly quantitative results. In this method the colour produced by the urine under standard conditions is compared with that from a known concentration of acetoacetic acid.

It soon became evident that in those cases in which a rapid cure was obtained the urine had a pronounced bacteriostatic power in vitro, and contained a high concentration of acetoacetic acid. Normal urines at pH 5·5 allow a quick outgrowth of *B. coli*, the growth ratio at 5 hours varying from 20 to 100. With ketonic urines, the results varied very greatly, but in general, those containing up to 0·05 per cent. of acetoacetic acid gave results very similar to normal urine. Those containing up to 0·1 per cent. often had a bacteriostatic action for 5 hours, but allowed outgrowth at 20 hours, while those with up to 0·2 per cent. frequently were bacteriostatic for 20 hours. Only very occasionally was killing complete in 20 hours.

ISOLATION OF THE GROWTH-INHIBITING AGENT

2. A chemical fractionation of a mixture of urines which were known to be actively bacteriostatic, or which contained a high concentration of acetoacetic acid, was next carried out, in an endeavour to isolate the growth-inhibiting agent. The *B. coli*-inhibiting power of each fraction in turn was tested by adding a small amount, representing a known volume of urine, to a filtered normal urine at pH 5·5 and implanting with *B. coli*. If the bacilli did not multiply as they habitually do in normal urine, it was assumed that the active bacteriostatic principle had been retained in the chemical fraction under test.

The results of these fractionation tests were briefly as follows:—

(*a*) Concentration in vacuo after neutralisation did not result in any loss of bacteriostatic activity.

(*b*) Removal of urea as urea oxalate from the concentrate left the activity unimpaired.

(*c*) Precipitation of inorganic salts, phosphatides and proteoses with acetone did not remove any activity.

(*d*) Removal of bases and amino-acids as phosphotungstates caused no loss of activity.

The concentrate now consisted almost entirely of organic acids. Lactic acid was removed, leaving an active concentrate consisting largely of *l*-β-oxybutyric acid. This acid was carefully purified by crystallising the calcium zinc salt several times. The bacteriostatic activity remained in the β-oxybutyric acid, and did not pass into the impurities. Similarly when the methyl ester was prepared, distilled in vacuo and hydrolysed, the resulting *l*-β-oxybutyric acid was active. The purity of the acid was checked by the melting point of derivatives, the optical activity of the sodium salt, and chemical analysis of the silver salt.

The results of the bacteriological tests on the purified *l*-β-oxybutyric acid dissolved in normal urine at pH 5·5 are given in Table I. Optically inactive β-oxybutyric acid was prepared synthetically, and this had a similar bacteriostatic activity.

TABLE I

—	Concentration.	Growth ratio—	
		At 5 hours.	At 20 hours.
	Per cent.		
l-β-oxybutyric acid ..	0·5	0·6	∞
	1·0	0·7	0·6
	2·0	0·7	0·5
Optically inactive β-oxybutyric acid ..	1·0	0·3	∞
	2·0	1·0	1·1

The growth ratios and oxybutyric acid content (determined by the Van Slyke method) of urines from two patients receiving the diet (Table II.) show by comparison with Table I. that the total bacteriostatic activity of the urine can usually be accounted for by the oxybutyric acid content.

TABLE II

—	Growth ratio—		Oxybutyric acid content.
	5 hours.	20 hours.	
			Per cent.
Mrs. A, March 16th, 1933 ..	0·6	∞	0·6
Mrs. A, „ 20th, „ ..	1·7	∞	0·7
Mrs. C, „ 2nd „ ..	1·3	∞	1·0
Mrs. A, „ 15th, „ ..	0·5	18	1·1
Mrs. A, „ 21st, „ ..	0·6	25	1·1

Helmholz states that ketonic urine is inactive above pH 5·6. We have found that pH has a great influence on the activity of solutions of β-oxybutyric acid in normal urine.

TABLE III

Concentration of β-oxybutyric acid.	pH.	Growth ratio—	
		5 hours.	20 hours.
Per cent.			
0·5	5·0	0·1	0
0·5	5·0	0·8	0·3
0·5	5·5	0·6	∞
2·0	5·5	0·4	0
2·0	5·5	0·7	0·5
2·0	6·5	0·8	∞
2·0	7·4	20	∞

The results recorded in Table III. confirm the observation of Helmholz that the bacteriostatic activity of ketonic urines is greatly reduced at reactions more alkaline than pH 5·6. Thus, while a urine containing 2·0 per cent. of oxybutyric acid is bactericidal at pH 5·5, it allows free outgrowth at pH 7·4. The practical point which emerges is that acidifying salts should be given at the same time as the ketogenic diet, since the greater acidity helps moderate concentrations of oxybutyric acid to become effective. It is also evident that the presence of acetone bodies cannot give to the blood at pH 7·4 an effective bacteriostatic power.

It appeared to be of interest to compare the bacteriostatic effect of β-oxybutyric acid with that of other organic acids. The results shown in Table IV. were obtained, using solutions in normal urine at pH 5·5.

TABLE IV

pH 5·5.	Growth ratio—	
	5 hours.	20 hours.
2 per cent. acetic acid ..	0·9	0·4
2 „ *n*-butyric acid ..	1·3	0·2
2 „ lactic acid ..	4·3	∞
2 „ acetoacetic acid ..	1·3	∞
1 „ „ „ ..	2·3	∞
0·5 „ „ „ ..	8·5	∞
2 „ acetone	0·8	∞

This shows that other acids possess bacteriostatic activity. Acetoacetic acid and acetone are weaker in their action than β-oxybutyric acid, and since they are present in the urine of patients on ketogenic diet in only 10–20 per cent. of the amount of the latter acid, they contribute only a small portion of the total activity.

DISCUSSION

While the urine from patients receiving ketogenic diet possesses the power of inhibiting the outgrowth of *B. coli* in vitro, complete killing was rarely obtained in 20 hours, even in the most successful cases. It is not yet clear how such urine can produce sterilisation of the urinary tract. It may be that the continued washing out with fresh inhibitory fluid is sufficient to kill all the bacteria. A truly bactericidal urine may exist temporarily if a hyperacidity or a greater effective concentration of oxybutyric acid occurs locally. Lastly, a difference exists between the conditions in vivo and in vitro. In vivo, any increased alkalinity caused by a small growth of bacteria is nullified by the continual excretion of fresh acid urine, whereas in vitro the alkalinity is unchecked and assists further growth by reducing the efficiency of the oxybutyric acid.

SUMMARY

The principal factor inhibiting the growth of bacteria in the urine from patients receiving ketogenic diet is *l*-β-oxybutyric acid.

The activity of this substance increases in proportion to the acidity of the urine.

I wish to express my sincere thanks to Dr. Leonard Colebrook, director of the laboratories, for much valuable help, and to Mr. W. R. Maxted who carried out the bacteriological tests.

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* *l*, lævorotatory.

ROYAL EYE HOSPITAL, ST. GEORGE'S-CIRCUS.—At the annual meeting recently it was stated that for the first time in the history of this hospital over 1000 in-patients were admitted last year. Complaints were made of the noise caused by the constant stream of tramcars outside.

CHLOROMA

AN ACCOUNT OF FOUR CASES

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AND
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In 1821 Allan Burns described the case of a young man with exophthalmos, tumours of the eyelids, and blindness. Removal of the eyeball disclosed a green tumour. The name chloroma appears to have been given to the disease by King in 1853. Numerous cases have since been recorded, but the disease is still rarely encountered. Four cases which have come under our observation during the last three years are described here.

THE FIRST CASE

A girl, aged 19, was admitted to St. Thomas's Hospital on May 30th, 1929. She had had pain in the back for seven months, in the right thigh for five months, and in the shoulders for a fortnight. She could neither stand nor walk. She died on June 26th, 1929.

On admission her temperature was 99° F., her pulse-rate 108. She was pale. There was a swelling of the body of the sternum and wasting of the muscles of the arms and legs. The biceps, triceps, and supinator-jerks were brisk, but other reflexes were not obtained. No sensory changes were found. She had retention of urine. The edge of the liver was palpable, but the spleen was not palpable. On June 2nd a blood examination showed: hæmoglobin, 70 per cent.; red cells, 4,128,000 per c.mm.; and leucocytes, 8300 per c.mm. Blood films were described as normal. A few days later a saddle-shaped area of anæsthesia appeared in the perineum on which a pressure sore developed, and she had incontinence of fæces. On June 6th radioscopy revealed a "diffuse rarefied mottling in ribs, pelvis, and left hip suggestive of secondary growth. Large absorbed area in left ilium ? primary." Bence-Jones albumosuria was not present. On June 19th her temperature was 104° F.; blood culture was sterile. Further pressure sores and a purpuric eruption appeared just before death.

Post-mortem examination.—The body showed extreme wasting. On the anterior surface of the sternum a greenish mass was seen extending from the junction of the manubrium with the body above to the xiphoid process below and occupying the whole width of the sternum laterally. On section this mass was seen to extend from marrow, through the bone, to the periosteum, which was raised by it. The green colour, bright when first seen, faded in the course of half an hour to a dull grey. Similar greenish tumours occupied the ribs, vertebræ, iliac bones, femora, and skull. Other bones were not examined. In each case the green mass was both endosteal and subperiosteal. Occasional localised deposits on the inferior aspect of the vault and over the base of the skull, between the bone and dura mater, were observed. The dura mater over the vault and greater part of the base was found separated from the bone. At one site a little new bone formation had occurred around the green mass. The diploë of the skull was quite green. In the vertebræ the green tumours were situated both before and behind the bodies. In the spinal canal the tumours were always extrathecal.

The *pericardium* showed no petechiæ. The *heart* (weight 11½ oz.) did not appear notably fatty. Scattered chronic adhesions were present in both *pleural cavities*, and a few recent subpleural hæmorrhages were found. The lungs were congested. The *liver* (weight 3 lb. 13 oz.) and *adrenals* appeared normal. The *spleen* weighed only 6¼ oz., and was of a uniform reddish-brown colour and soft. There was no enlargement of the *lymphatic glands*. The mucous membrane of the *bladder* was inflamed, and multiple abscesses were found in both *kidneys* (combined weight 10 oz.). No abnormality was detected in the *genital organs*. No naked-eye changes were found either in the *brain* or *spinal cord*.

THE SECOND CASE

A woman, aged 39, was admitted on Sept. 19th, 1929. She complained of pain in the back and left leg, and had had a sensation of numbness in the left lumbar region for 11 weeks. The left ankle had become swollen, and she had had incontinence of urine and fæces for five weeks. She died on Sept. 29th.

On admission there was pallor and muscular wasting in the left leg, over which vibration sense was impaired. Tactile sensibility was absent over the feet. Motor power was poor. Plantar reflexes and ankle-jerks were not obtained. A mass was present over the sternum; this was neither bony nor tender. The veins over the front of the chest were prominent. Albumin, pus, and casts were present in the urine, but there was no Bence-Jones albumosuria. Three days after admission purpura appeared. On Sept. 26th the report of a radioscopic examination was: "Pelvis, vertebræ, ribs, and sternum showed no evidence of metastases in bone." A blood examination showed: hæmoglobin, 34 per cent.; red cells, 1,990,000 per c.mm.; and leucocytes, 25,630 per c.mm. Of 200 leucocytes 10·5 per cent. were polymorphs, 65 per cent. lymphocytes, 2·5 per cent. hyalines, 1·5 per cent. metamyelocytes, 0·5 per cent. neutrophil myelocytes, and 20 per cent. primitive lymphocytes. Many "smudges" were seen. Anisocytosis, poikilocytosis, polychromasia, and punctate basophilia were present. Some of the platelets were very large. The patient became rapidly worse and died ten days after admission.

Post-mortem examination.—Scattered purpuric spots were present generally over the whole body and brownish pigmentation over both shins. A mass 3 in. in length, and in breadth equal to that of the sternum, subperiosteal in position, occupied the anterior aspect of the sternum in its middle third. A green colour, rapidly fading on exposure, was seen on section. Similar masses were found about the ribs and on the xiphoid process, and in each case the mass appeared to be subperiosteal and not medullary in position. A mass, the size and shape of two adjacent oranges, was present on the anterior aspect of the sacrum at the level of the pelvic brim. Extensions from this mass covered the whole of the sacrum and all the pelvic bones on their internal aspects. All of this tumour mass was subperiosteal, and on section showed a greenish colour with numerous hæmorrhages and necrosis in the centre. The pelvic veins, which were compressed but not invaded, were varicose. In the spinal canal many extrathecal green masses, especially abundant in the lumbo-sacral region, were found. Examination of the medullary cavities of the ribs showed that apparently neither fatty marrow, nor red marrow, nor chloromatous tissue, was present. The femoral marrow was infiltrated by a greenish mass.

Pericardium.—Petechiæ were present beneath the epicardium. The muscle substance of the heart was pale and soft.

Lungs and pleuræ.—About one pint of clear fluid was found in each pleural sac, and chronic adhesions were present on the left side. Both lungs were slightly œdematous and showed collapse of their lower lobes. The *stomach* contained altered blood and many submucous lymphoid nodules resembling miliary tubercles. In the *intestine* the Peyer's patches appeared normal. Small hæmorrhages were present in the wall of the colon. The *liver* (weight 4 lb.) showed one small hæmorrhage in the right lobe. The *spleen* was slightly larger than normal and soft in consistence. The *adrenals* appeared swollen. Both *kidneys* (combined weight 8½ oz.) were pale and contained several small greenish masses resembling the subperiosteal masses in colour and consistency. All were apparently subcapsular in position. There was no macroscopic evidence of infection of the kidneys, but the interior of the *bladder* revealed cystitis and was encrusted with phosphates. The *uterus* and *Fallopian tubes* appeared normal, but each ovary showed a greenish tumour about the size of a walnut. The *brain* showed a brownish pigmentation of the arachnoid over the medulla, but otherwise appeared normal.

THE THIRD CASE

A labourer, aged 33, was admitted on Dec. 12th, 1929. He complained of pain in the right leg and back for ten weeks, and of palpitation and breathlessness for six weeks. He had been treated at Swanage Cottage Hospital shortly before admission. He died on Jan. 9th, 1930.

On admission he was obviously anæmic, and purpura was present. The lymph glands were not palpable. His temperature was 100° F., and his pulse-rate 100. There was bulging of the left chest with irregularity of the sternum, and bleeding from the gums and into the palate. The liver and spleen were not palpated. The fundi of both eyes were pale, with flame-shaped hæmorrhages. Blood films were examined on Dec. 18th by Dr. A. C. Ingram, who reported as follows: "Differential leucocyte count: polymorphonuclear cells, 8 per cent.; lymphocytes, 20 per cent.; lymphoblasts, 69 per cent.; monocytes and premonocytes, 3 per cent. Marked anisocytosis; a few red blood-cells show polychromasia. I should expect to find between 40,000 and 80,000 white cells per c.mm., but the slide is so uneven that an accurate estimate is not possible. The condition is one of lymphatic leukæmia." Blood examination on Dec. 30th showed hæmoglobin less than 20 per cent., red cells, 925,000 per c.mm.; leucocytes, 34,000 per c.mm.; polymorphs, 4 per cent.; small lymphocytes, 83 per cent.; large lymphocytes, 11 per cent.; and hyalines, 2 per cent. Blood examination on Jan. 9th by Dr. S. P. Meadows, shortly before death, showed hæmoglobin about 5 per cent.; red cells, 480,000 per c.mm.; and leucocytes, 31,000 per c.mm. The differential leucocyte count (400 cells) showed: lymphoblasts or myeloblasts, 76 per cent.; small lymphocytes, 19 per cent.; polymorphs, 4 per cent.; and transitionals, 1 per cent.

Post-mortem examination.—Occupying the sternum from the level of the second costal cartilage to the xiphoid process were a number of subperiosteal deposits. These were for the most part on the posterior aspect of the sternum and extended for a slight distance on to the adjoining portions of the costal cartilages. One deposit was present anteriorly over the third left costal cartilage close to its junction with the sternum. Similar masses were present over the whole length of the spine from the first dorsal vertebra to the lower end of the sacrum. These were situated on the anterior aspect and laterally, where they extended on to the adjoining portions of the ribs for distances up to 1½ in. on their anterior surfaces.

A portion of the spine, comprising the eleventh and twelfth dorsal vertebræ, was removed for further examination. It was found that the deposit was entirely subperiosteal. It was not present in the spinal canal. Apart from the subperiosteal deposit, no evidence on naked-eye examination of any involvement of the bodies of the vertebræ was found. Numerous subperiosteal deposits were also present in the true pelvis, on the anterior aspect of the sacrum, on the posterior aspect of the pubes, and on the iliac bones laterally. On section all these subperiosteal deposits were green in colour and they all faded on exposure. Examination of about 3 in. of the middle of the shaft of the left femur showed that part was occupied by what appeared to be a hæmorrhage and part by fatty marrow. No green tissue, such as that which constituted the subperiosteal deposits, was found in the medulla of the femur, ribs, or vertebræ examined.

Numerous ecchymoses were present on both visceral and parietal layers of the pericardium. The *heart* (weight 16½ oz.) was enlarged and dilated. A typical "thrush-breast" appearance was present beneath the endocardium of the left ventricle, especially on the musculi papillares. *Lungs and pleura:* recent pleurisy was present at the base of the right lung and subpleural petechial hæmorrhages were found over both lower lobes. The lungs were very œdematous. The *liver* (weight 4 lb. 4 oz.) was enlarged, pale and firm. The *spleen* (weight 5 oz.) was of normal size, colour, and consistence. No enlarged *lymphatic glands* were found either in the neck, axillæ, thorax or abdomen. The inguinal glands were slightly enlarged. The *kidneys* (combined weight 12 oz.) were pale, but the vessels were congested. The cortex was swollen, especially in the inter-pyramidal portions. The *brain* appeared normal.

THE FOURTH CASE

A boy aged 4½ years was admitted on July 2nd, 1931. He had suffered from colds and weakness. His tonsils and adenoids had been removed six months before admission, and a paracentesis for bilateral otitis media had been performed on May 31st. Recently there had been vomiting and the abdomen had been getting larger. He died on July 25th.

On admission his temperature was 97°–99° F., and his pulse-rate 100. The child was pallid, listless, and dull. There were petechiæ on the legs and shoulders. The liver and spleen were enlarged to the level of the umbilicus, and the axillary and cervical glands were slightly enlarged. Blood examination on July 9th showed: hæmoglobin, 30 per cent.; red cells, 2,060,000 per c.mm.; leucocytes, 132,000 per c.mm.; polymorphonuclears, 4 per cent.; lymphocytes, 15 per cent.; transitional cells, 2 per cent.; and primitive cells, 79 per cent. The platelets were markedly diminished. After radiotherapy the patient became worse. Blood examination on July 17th showed: 3060 leucocytes per c.mm., of which 8 per cent. were polymorphonuclears; 3 per cent. metamyelocytes, and 89 per cent. primitive cells (? lymphoblasts).

Post-mortem examination.—The body showed pallor and emaciation. The sternum, ribs, and vertebral column, the skull, both internally and externally, and other parts of the osseous system examined failed to show any subperiosteal masses. Examination of a rib and of the middle of the femur showed that the marrow was scanty and reddish in colour.

The *kidneys* were pale and firm. On section several bright grass-green masses (average size that of a 6*d.*-piece) were seen. The green colour faded in a few minutes.

The *heart* showed subpericardial and subendocardial petechiæ, and fatty streaks were present in the aorta. The *lungs* showed numerous hæmorrhages, bronchitis, and œdema. The *thymus* appeared normal. In contradistinction from what was found during life, the liver and spleen showed no enlargement. The *spleen* showed chronic perisplenitis. On section it was firm and mottled red in colour, and lymphoid masses were not readily discernible. The *liver* showed slight capsular thickening. On section it was a pale yellow colour but firm in consistence. The stomach contained a little changed blood, and a few petechiæ were present in the mucosa. In the intestine the Peyer's patches appeared normal. The cervical, mediastinal, and prevertebral lymphatic glands were little, if at all, enlarged, but the mesenteric glands were slightly larger than is usual at the age. Several were calcified, but no active tuberculosis was found. Examination of the brain and meninges and of the orbital cavities showed no abnormality.

HISTOLOGICAL EXAMINATION

The tissues were fixed in Kaiserling's fluid and paraffin sections were made. The stains employed were hæmalum and eosin and van Gieson's stain. Several sections were stained by Giemsa and several by Scharlach R. All tissues examined were obtained at autopsy and no oxidase stains were investigated.

The *subperiosteal deposits*, which were found in the first three cases only, consist mainly of two elements:—

(1) Large numbers of mononuclear cells of varying size and shape, hereinafter alluded to as "chloroma cells." All are definitely larger than small lymphocytes. Examined by the oil-immersion lens, the cells are distinguished by the presence of large nuclei which vary considerably in shape, some being spherical, some oval, and some slightly elongated. In all, the nuclear membrane stains intensely, but the nucleus as a whole stains less deeply than that of a small lymphocyte. The nucleus has a definitely reticular structure and always comprises by far the greater part of the cell—indeed, in some cells no cytoplasm can be distinguished—but in the greater number cytoplasm can be seen, varying from a small rim to an amount equal to that found in a large lymphocyte. No definite granules in the cytoplasm were seen. In sections stained with hæmatoxylin and eosin the cytoplasm shows a faint pink coloration. In Case 1 the cells on the whole contain more

cytoplasm than in either Case 2 or Case 3. They are less compressed and tend to be more uniformly spherical. Several cells showing mitotic figures, apparently typical, were observed. In Case 2 these cells, which comprise by far the greater portion of the deposit, are much more closely packed. The cytoplasm is only occasionally discernible; most cells appear to consist almost entirely of nucleus. Mitoses are more abundant than in either of the other two specimens. An occasional eosinophil leucocyte is seen.

(2) A supporting reticulum of connective tissue, which certainly exceeds in amount that usually seen in a round celled sarcoma. In Case 1 the reticulum is arranged in long strands of fine wavy fibrils, interlacing. In places numerous spindle-shaped nuclei are present (Fig. 1). In Case 3 the supporting connective tissue is much greater and is arranged in a much closer network, with the result that it tends more to separate cells rather than groups of cells as in Case 1. In Case 2 there is considerably less reticulum formation than in either of the other cases, but in places small collections of fibroblasts were seen. In this case the general appearance of the subperiosteal deposit more closely resembles a round-celled sarcoma. In Cases 1 and 3 the impression is given that a considerable development of fibrous tissue has taken place in the subperiosteal deposits, and in places the scarcity of nuclei suggests that a considerable portion is fully developed. Very few vessels were found in the subperiosteal deposits; in all cases they appeared to be normal in structure. A certain number of red blood-cells were found irregularly, but these were not seen in the blood-vessels, which were empty. Apart from the cells described above, a very few small lymphocytes were the only cells seen.

Bone-marrow.—In Case 2 sections of marrow from the femur show that the tissue almost exclusively consists of cells similar to those found in the subperiosteal deposits ("chloroma cells"), and, in addition, a few eosinophil myelocytes and leucocytes were seen. No evidence of erythropoiesis, no lymphocytes, and no granulocytes, other than eosinophils, were found. No fatty tissue was found in this marrow. In this case also a complete section of a rib with its subperiosteal deposit was made. The medullary cavity is seen to contain cells exactly similar to those in the subperiosteal deposit, and the normal structure of the bone-marrow was not found. Red cells were very scanty.

In Case 3 the portion of marrow from the middle third of the femur, described in the macroscopic examination as fatty, showed on section that it was composed of adipose tissue. The portion noted as "hæmorrhage" macroscopically showed a very little fat, a large number of vessels lined by endothelium, many red cells, large mononuclear cells laden with brown pigment, a number of eosinophil cells chiefly of myelocyte type, some polymorphonuclear cells showing pyknotic nuclei, and a few cells resembling small lymphocytes, but, exceeding all these in number, the majority of the cells in this portion of the marrow resemble those found in the subperiosteal deposits. Smears made from this portion of the marrow stained by Leishman's and Giemsa's methods show that of these latter cells the larger ones only show lighter areas in the nuclei resembling the nucleoli of myeloblasts. Further differentiation of the cells is rendered impracticable by post-mortem change. It is noteworthy, however, that no nucleated red cells were found in the marrow, and films fixed in Schaudinn's solution and stained by hæmatoxylin and eosin confirmed these observations.

Lymphatic glands.—In Case 3 sections of lymph glands from the cervical, axillary, mediastinal, and inguinal glands were prepared and showed a general diminution in lymphoid cells and in the number of lymphoid follicles, a relative, if not absolute, increase in reticulum, and large numbers of red blood corpuscles, many of which were contained within large cells of endothelial type. These phagocytic cells were found scattered irregularly throughout the gland, except in the few follicles remaining. They were especially numerous in the mediastinal gland, where they reached a considerable size and where some of them appeared to contain from a dozen to twenty red blood-cells closely packed together. In many of these phagocytes no actual red blood-cells were present, but a considerable amount of yellowish-brown pigment, evidently resulting from red-cell disintegration. We were able to recognise "chloroma cells" only in the mediastinal gland, in which they occurred in considerable numbers generally diffused throughout the gland, except in the follicles. In all glands examined occasional eosinophil cells were seen. In Case 4 sections were made of a prevertebral gland from the abdomen. This gland showed disappearance of lymphoid follicles and great reduction in small lymphocytes. The majority of the cells present were "chloroma cells," which were closely packed and showed a number of mitotic figures. An occasiona

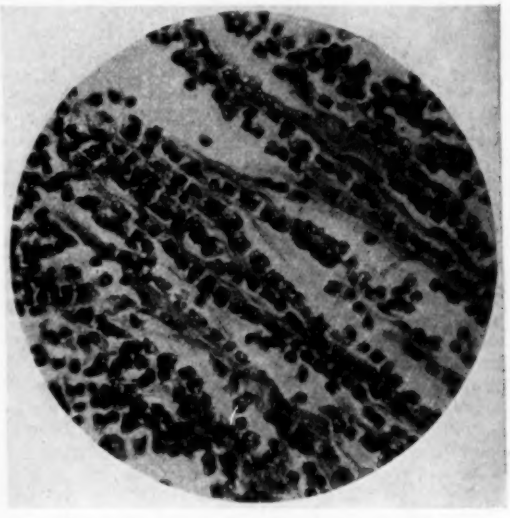

FIG. 1.—Subperiosteal deposit. (× 320.)

eosinophil cell was found, but red cell phagocytosis was not observed.

Spleen.—In none of the four cases were "chloroma cells" recognised in the spleen.

Examination of sections of spleen in Case 1 shows that the Malpighian corpuscles are numerous and prominent. There is no thickening of the trabeculæ of the vessels. The pulp contains numerous cells of the endothelial type and many giant cells showing red cell phagocytosis. Only a few eosinophil cells were observed. In Case 2 the Malpighian corpuscles are reduced in number. The pulp contains a fair number of red blood-cells and particles of yellow pigment, some of which is contained in large phagocytic cells. In addition, a fair number of polymorphs is present, together with some eosinophils and eosinophil myelocytes. In Case 3 considerable post-mortem autolysis rendered the histological examination difficult. The Malpighian corpuscles are reduced in number, and the arteries contained in them show considerable thickening of the trabeculæ and also a number of spindle-shaped connective tissue cells scattered irregularly throughout the pulp. The pulp contains a large number of red blood corpuscles and much yellowish-brown pigment, for the most part not contained in cells. Numerous lymphocytes and a sprinkling of eosinophils are present. In Case 4 the spleen showed thickening of the capsule. The Malpighian corpuscles were diminished in size and considerably diminished in number. Their arteries were thickened. There is a general congestion and great increase in the fibrous reticulum. A number of eosinophils is present, also small uninucleated giant cells containing yellowish-brown pigment.

Liver.—In Case 2 sections of liver show that the liver cells are separated from one another by a variety of cells—red cells, "chloroma cells," and, in smaller numbers, eosinophil myelocytes and leucocytes, and occasional polymorphonuclear cells.

In Case 3 a quantity of bile-pigment generally diffused throughout the specimen is seen. It is both intra- and

extra-cellular. Only a small amount of fat is seen. Foci of inflammation, many of which are periportal and characterised by polymorphs and endothelial cells, are present. No "chloroma cells" were found. In Case 3 the liver showed a pronounced fatty change, and small foci of cells were present in the periportal areas. The majority of these cells were found to be "chloroma cells," but many spindle-shaped connective tissue cells and a few small lymphocytes were present.

Kidney.—In Case 2 a section was made through a portion of the green mass at its junction with apparently normal renal tissue. The green deposit is found to be composed of renal tissue densely

FIG. 2.—Chloromatous nodule in kidney. (× 48).

infiltrated with "chloroma cells," which are present in large numbers beneath the capsule and extend for some distance into the substance of the organ; the edges are rather indefinite. These cells are present only in interstitial tissue. Occasional eosinophil and polymorphonuclear cells are present (Fig. 2). In Case 3 section of kidney showed post-mortem autolysis, but no other changes were observed. In Case 4 section through the green nodule, which was situated in the medulla, showed that the nodule was composed for the most part of "chloroma cells" widely separating the tubules.

In Case 3 section of *lung* showed chronic venous congestion and œdema. Numerous endothelial cells containing the typical brown pigment were seen. No "chloroma cells" were found. In the same case sections of heart stained by Scharlach R showed an advanced degree of fatty degeneration of the muscle-fibres. In Case 4 punctiform hæmorrhages were present in the myocardium. "Chloroma cells" were not observed in either case.

Discussion

In the first two cases the earliest signs and symptoms suggested an affection of the nervous system. The association of nervous symptoms with chloroma has recently been emphasised by Macdonald Critchley and Greenfield. In the last case general debility appeared to be the complaint. In all four cases pallor of the skin and visible mucous membranes was observed on admission. In the first case examination of the blood three weeks before death showed a slight degree of secondary anæmia but no evidence of leukæmia. No further blood examination was made in this case. In the other cases a blood picture suggesting leukæmia was found, and the great majority of the leucocytes were mononuclear cells, of which a large percentage were cells of primitive type, with typical nucleoli, but we do not feel justified in deciding whether they should be regarded as myeloblasts or "lymphoblasts." We regard the oxidase reaction as untrustworthy in this connexion. In the first three cases green subperiosteal deposits were found at autopsy, and a deformity of the sternum was observed during life. In the last case no subperiosteal deposits were found, and green tumours were found in the kidneys only. Exophthalmos was not found in any of the cases.

A study of the literature shows that the disease is rarely recognised during life. The diagnosis seems to depend upon finding a high grade of anæmia associated with a leukæmic blood picture (cases described with a normal leucocyte count, total and differential, are rare and open to criticism). In addition, evidence of tumour formation, especially subperiosteal, must be available—e.g., exophthalmos, the classical sign; deformity of the sternum, present in our cases; and various nervous symptoms attributable to pressure of tumours. Radiological examination is of value. Cases in which the green colour has been seen during life through skin or mucous membranes, as in Byrom Bramwell's case, are seldom encountered.

The view which commands most support at the present time is that chloroma is a manifestation of leukæmia, as first emphasised by von Recklinghausen in 1885. Many cases have been described in the literature in which chloromatous masses were considered to be composed of cells derived from the hæmopoietic tissues, either lymphocytes, myelocytes, or cells of primitive type. From an examination of the post-mortem material in our cases we are not prepared to identify the large mononucleated cells found in the chloromatous masses with any cell found in normal or pathological blood. The differentiation in fresh blood films of myeloblast from "lymphoblast" is sufficiently difficult, if, indeed, it is possible at all. It seems to us desirable to examine fresh films of chloromatous tissue taken from living material. We are unable to suggest any explanation for the green coloration. Many authors agree that its presence is not sufficient basis for the isolation of these cases as a separate disease. Sternberg cites 21 cases of myeloblastic leukæmia without tumour formation, of which three showed green coloration of the bone-marrow only; one case with several lymph glands in addition, and a fifth case with green colour of marrow and splenic foci. In cases of chloroma, on the other hand, a few of the deposits in any one case may fail to show the green colour. A green tumour may be composed solely of a particular type of cell—e.g., large mononucleated cell, myelocytes, lymphocytes, or of a mixture of such types—yet apparently identical collections of cells may show no green colour. The green colour, therefore, is not peculiar to, or constant in, any one type of cellular collection.

These four cases show certain important features which contrast strongly with the usual findings in leukæmia. In the first three cases we were impressed by the extent of the subperiosteal deposits, as compared with the slighter changes found in the bone-marrow. In the first case green masses were found in the marrow of all the bones examined, but in the second case green masses were found in the marrow

of the femur only, and in the third case none was found in the marrow. In this third case, where the subperiosteal deposits were most extensive, the marrow of the femur, except for a few small islets of cellular proliferation, consisted of fat, and in no way resembled the marrow of leukæmia. The rapid and extensive development of the subperiosteal deposits in these cases appears to proceed independently of changes in the marrow. In a case of chloroma described by Lewis, the histology of the marrow differed markedly from that of a chloromatous deposit. The femoral marrow was described as "showing great hyperplasia of all the normal marrow cells, no particular type of cell predominating," whereas the green nodule in the kidney showed "cells resembling plasma cells, together with small round cells and occasionally cells with multiple nuclei." Indeed, the impression is gained from a study of the clinical history, as well as from the post-mortem findings, that in Cases 2 and 3 the earliest changes were subperiosteal.

It is remarkable that in not one of these four cases was any change suggestive of leukæmia found in the spleen as the result of either macroscopic or microscopic examination. Cells similar to those found in the green tumours were not found in the spleen, although readily recognisable in the mediastinal lymph glands (Case 3). Radiological treatment was applied over the spleen in Case 4, but in this case, three weeks before death, the total leucocyte count was 132,000 per c.mm. Even in myeloblastic leukæmia Sternberg found in his series of 21 cases that the histological investigation showed in all these cases undoubted myeloid foci in spleen, lymph glands, and liver, also a myeloid bone-marrow. It seems incompatible with a "leukæmic process," associated with such widespread infiltration beneath the periosteum and in the viscera, that the spleen should be exempt. Such a distribution is more suggestive of neoplasm.

Sternberg states that it must be recognised that leukæmic blood pictures are in no way "pathognostic." Leukæmic or "leukæmoid" blood changes may occur in various disease processes. For instance, in the course of acute infectious diseases a blood picture, only with difficulty distinguished from acute myeloid leukæmia, may be found. Roth has observed a case in which acute miliary tuberculosis evoked the blood picture of acute myeloid leukæmia. Examples of patients with apparently typical carcinomata or sarcomata in whom a "leukæmic" blood picture supervened are described under various names. Commonly the "leukæmia" appears to be of lymphatic type, but occasionally "myelogenous leukæmia" is seen.

We wish to thank the physicians of St. Thomas's Hospital in charge of these cases for clinical notes, and Mr. T. H. Wilson for microphotographs.

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THE VALUE OF
SALICYLATES IN THE PREVENTION OF RHEUMATIC RELAPSES

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The value of salicylates in the treatment of acute rheumatism is still uncertain. Different authorities hold widely divergent views, as illustrated by the statements of Miller [1] and Motzfeldt.[2] The former believes the salicylates exert a specific action in acute rheumatism, diminishing the activity of the infection, while the latter states that these drugs only mask the illness, and that it is improbable that they have any influence on the course of the disease. The general view is that while salicylates produce a fall in temperature and considerably improve the arthritis, they have little effect on the more proliferative lesions such as carditis and nodules. The investigations of Graef and his colleagues [3] on the natural course of rheumatic fever support Motzfeldt's suspicions that the salicylates may not be responsible for the early subsidence of the joint symptoms and the fall in temperature, but that the short duration of these phenomena is the natural course of the disease, even when untreated. However, one of the modern conceptions of acute rheumatism is that it is allergic in nature. Derick, Hitchcock, and Swift [4] have shown that the arthritis of the serum sickness following the administration of horse serum can be prevented if "anti-rheumatic" drugs be given for ten or more days following the injection of the serum; but that other manifestations of serum sickness, such as urticaria, are unaffected by this treatment. For this reason it might be hoped that salicylates, however impotent to affect the established disease, might be of value in preventing relapses in rheumatic children. Schlesinger [5] and others have shown that acute throat infections in rheumatic children are apt to be followed by a rheumatic relapse after an interval of 10 to 21 days. He found that aspirin given for some weeks after the onset of tonsillitis was valuable in preventing the recurrence of serious rheumatism. Sheldon [6] however, in a small number of cases, was unable to find any very convincing proof of this. Thomson [7] in his investigations at Birmingham found that sodium salicylate in doses of grs. 30 daily was of no value to the convalescent rheumatic child. Leech [8] has reported a controlled series of cases treated by daily rations of acetyl-salicylic acid grs. 20 for six months. He found that there were fewer recurrences in the treated group (7·4 per cent.) than in the untreated controls (11·4 per cent.). Further, the control group did not do so well as regards gain in weight, and a larger proportion of the treated cases showed diminution of the cardiac physical signs.

AN INVESTIGATION

The present inquiry deals with 41 children who had suffered from rheumatic heart disease. The children were unselected as far as possible. The series includes patients with no suggestion of activity at the beginning of the investigation as well as those with suspicions of a smouldering infection. Similarly the control series was entirely unselected. These cases have been treated with acetyl-salicylic acid grs. 10 three times a day for 12 months. They were

seen every three or four weeks, and observations made on their symptoms, physical signs, and weight. We have found, as also have McCullough [9] and Warner,[10] that the body-weight is a valuable guide to the progress of these cases. The results are shown in Table I., and may be compared with the findings in 106 untreated children of similar ages shown in Table II. No intolerance to the drug was noted.

TABLE I.—*Showing the Findings in the Treated Cases*

Sex	Age.	Cases	Average gain in weight in 12 months.	Physical signs.			Relapses.
				De-creased.	I.S.Q.	In-creased.	
M	5–6	1	6 lb.	—	—	1	1
F	5–6	1	6 ,,	1	—	—	—
M	6–7	—	—	—	—	—	—
F	6–7	1	5 lb.	1	—	—	—
M	7–8	3	6 ,,	—	1	2	1
F	7–8	1	3½ ,,	1	—	—	—
M	8–9	1	3½ ,,	—	1	—	—
F	8–9	1	?	—	—	1	1
M	9–10	3	4½ lb.	2	1	—	—
F	9–10	5	7½ ,,	2	3	—	—
M	10–11	2	7 ,,	—	2	—	—
F	10–11	6	9½ ,,	2	4	—	—
M	11–12	2	8½ ,,	1	1	—	1
F	11–12	6	8½ ,,	2	4	—	—
M	12–13	1	7 ,,	1	—	—	—
F	12–13	4	10½ ,,	1	2	1	—
M	13–14	1	7½ ,,	—	1	—	—
F	13–14	2	19 ,,	—	2	—	1
Total cases		41	—	14	22	5	5
Percentage		..	..	34·0	53·6	12·1	12·1

TABLE II.—*Showing the Findings in the Controls*

M	5–6	1	0 lb.	1	—	—	—
F	5–6	2	4½ ,,	—	2	—	—
M	6–7	1	9½ ,,	—	1	—	—
F	6–7	8	4½ ,,	5	2	1	3
M	7–8	5	4½ ,,	1	3	1	1
F	7–8	4	9½ ,,	—	4	—	1
M	8–9	3	5 ,,	—	2	1	1
F	8–9	5	5½ ,,	1	4	—	2
M	9–10	7	5 ,,	2	4	1	2
F	9–10	10	6 ,,	4	6	—	3
M	10–11	5	6½ ,,	1	4	—	—
F	10–11	12	5½ ,,	3	8	1	3
M	11–12	7	8 ,,	1	5	1	1
F	11–12	14	10½ ,,	4	9	1	1
M	12–13	4	8½ ,,	—	4	—	—
F	12–13	11	11½ ,,	1	10	—	—
M	13–14	2	10½ ,,	1	1	—	—
F	13–14	5	7½ ,,	—	3	2	1
Total cases		106	—	25	72	9	19
Percentage		..	..	24·5	67·9	8·4	17·9

I.S.Q. = In statu quo.

Frequency of relapses.—Relapses of a rheumatic nature—i.e., chorea, arthritis, or carditis—were observed in 12·1 per cent. of the treated cases as compared with 17·9 per cent. of the controls. At first sight this may appear to be a significant difference. It must be remembered, however, that attendance for the treatment was entirely voluntary, and that half the patients who commenced treatment stopped attending before 12 months had passed. This lack of attendance was due to various reasons: (1) there was nothing apparently wrong with the child, therefore attendance ceased; (2) the child did not show any marked improvement; (3) other illness in the home which caused the comparatively well child to be neglected. In addition, attendance was likely to be more constant in those cases showing signs of improvement since the parents would be encouraged to continue the treatment. It is probable that the discrepancy in the incidence of relapses in the two groups may be explained by these factors. In any case the administration of the salicylate did not prevent relapses.

Changes in physical signs.—The abnormal physical signs in the heart decreased or disappeared in 34·0 per cent. of the treated cases as compared with 24·5 per cent. of the controls. On the other hand, 12·1 per cent. of the treated cases showed an increase in the physical signs as compared with 8·4 per cent. of the untreated. In view of the comparatively small number of cases studied these differences are probably of no significance.

Gain in weight.—For all ages the average gain in weight showed no significant difference in the two groups.

General health.—This is a difficult factor to assess. Several of the parents of the treated children stated that "they had never been so well" or "never had so good a winter." Such cases were persevering in their attendances. On the other hand, it was not infrequent to receive complaints that the children were no better. In some cases (not included in this series) these complaints were so insistent that the salicylates were stopped and other therapy, such as cod-liver oil and malt, substituted in an attempt to improve their condition.

DISCUSSION AND CONCLUSION

In general these results are closely similar to those reported by Warner [10] following the administration of Radiostoleum and calcium salts. It is possible that the slight beneficial effects noted are due to the increased general attention which is apt to be paid by parents to children receiving treatment of any kind. The present series of cases shows little if any evidence that the prolonged administration of salicylates is of value in preventing relapses in rheumatic children.

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UNUSED CONVALESCENT HOMES.—Mr. J. Stewart Oxley, who presided at the annual meeting last week of the Metropolitan Convalescents' Institution, commented upon the smaller number of admissions during the last few years. This reduction raised doubts of the wisdom of establishing new convalescent homes, especially when the cost falls upon the rates, while those already in existence were more than sufficient to provide for those whose ill-health needed a period of convalescent treatment. The institution's homes at Walton-on-Thames, Broadstairs, and Bexhill receive between 5000 and 6000 men, women, and children yearly.—A similar complaint was made at the annual meeting of the Prudhoe Memorial Convalescent Home at Whitley Bay, Northumberland. Councillor Angus Watson, Deputy Lord Mayor of Newcastle-on-Tyne, pointed out that the home could be doing much more work and added: "It is tragic to think that our public assistance committee and other charitable organisations are providing to-day at a cost of some half-million a year, and facing a deficit of some £70,000, for people who are permanently ill for the want of some such attention as these homes could have given at the right time." Last year 637 men and 459 women were admitted, but the accommodation for men was never fully occupied. It was suggested that there was no need for the miners to have spent a large sum upon the acquisition of Conishead Priory at Ulverston when the Whitley Bay home could accommodate their patients for 14s. per week. The cost is 25s. and the difference is made up from the interest of the accumulated funds which amount to £60,000. Last year's working showed a credit balance of £2767.

MEDICAL SOCIETIES

HARVEIAN SOCIETY OF LONDON

A MEETING of this society was held at the Paddington Town Hall on April 13th, with Col. E. L. GOWLLAND, the president, in the chair. A discussion on the

Influence of Böhler on the Treatment of Fractures

was opened by Mr. R. WATSON JONES, whose remarks were illustrated by a cinema demonstration. The importance of Böhler's teaching, he said, was not to be looked for in the technical details of the methods he used, but in the influence it had had on the *principles* of fracture treatment. These principles involved early anatomical reduction, followed by complete immobilisation of the fracture, with simultaneous active mobilisation of all other parts of the limb. The older methods, on the other hand, often consisted in excessive immobilisation for several weeks, followed by forced movements; in other words, the limb was subjected to a function-disuse, followed by forced passive movements. Massage, as used in the treatment of fractures, was nothing but a soothing analgesia, and, whatever might be the instructions given by the surgeon, the massage was always accompanied by passive movements. The factors producing stiffness in joints following fractures were: (1) exudate in the joint; (2) œdema around the joint; (3) immobilisation without function of the part; and (4) immobilisation in an abnormal position. All these factors Böhler's methods were designed to combat.

Mr. Watson Jones demonstrated the methods he himself used in the treatment of Colles's fracture, fracture of the scaphoid, Pott's fracture, fracture of the bones of the leg and of the spine. The cinema showed the patients wearing first the "old-fashioned" splints, such as Carr's splint, and then the moulded plaster casts, as advocated by Böhler. A patient with a Colles's fracture was shown making a bed and peeling potatoes on the day after the injury. Another patient with a Pott's fracture was walking 24 hours after the accident, with the leg in plaster to the knee, but otherwise behaving almost as if nothing had happened to him. Patients with fracture of both bones of the leg walked within three weeks—some earlier. Crush fractures of the spine were reduced by hyper-extension, immediately put in plaster jacket in this position, and allowed to walk, often within a few days.

The factor of constantly recurring trauma as a cause of non-union was emphasised. Non-union in the neck of the femur was entirely due to hyperæmia caused by these repeated traumata, which were particularly liable to occur in this fracture because of the difficulties of obtaining efficient immobilisation. By the Whitman method of treatment in an abduction plaster, union was obtained in 50–60 per cent. of cases; with the insertion of a Smith-Petersen nail, ensuring perfect immobilisation, union was obtained in 100 per cent. of cases. The principle of efficient and prolonged immobilisation of the fracture was of much greater importance than the principle of mobilisation of the limb, and the latter might have to be sacrificed to the former. Böhler had considerably increased the time of immobilisation for most fractures—e.g., fractures of the bones of the forearm and leg were immobilised for ten weeks, fractures of the scaphoid often for as long as six months.

Mr. E. P. BROCKMAN confined his remarks to the methods of treating certain special fractures. Supracondylar fractures of the humerus in children he treated in a position of extension, in a plaster cast applied over a thin layer of wool, and with the forearm in pronation. Supination pulled the lower fragment out of alignment, whilst a combination of flexion and pronation was ineffective in retaining the reduction of the fracture. Supracondylar fractures should never be treated by open operation, and massage and passive movements should never be used in their treatment. Fractures of the internal epicondyle were best treated by pegging on the displaced fragment. The difficult comminuted fractures of the lower end of the humerus gave the best results if treated on a gutter-splint for two weeks. Open operation, as usually recommended in the text-books, was unsuccessful from the point of view of mobility of the elbow-joint. The recognised treatment of the separated upper femoral epiphysis gave poor functional results, with arthritis of the hip, but Mr. Brockman had obtained very good results by weight extension through a pin in the tibia. He did not use walking callipers in the after-treatment, for he did not believe any calliper was really weight-bearing.

Mr. BRYAN BURNS gave his impressions of Böhlers hospital in Vienna, where as many as six or eight new cases were treated every day. The method of anæsthesia used was injection of 20 per cent. novocain. This gave an anæsthesia lasting four hours, but it could be employed only during the first 48 hours following the fracture. Mr. Burns then showed radiograms of two types of fracture which presented great difficulties in treatment—viz., fractures involving the floor of the acetabulum, and fractures of the os calcis. In the acetabular fractures he had found great difficulty in getting the floor of the acetabulum to come out, but, even without complete reduction, a good functional result could be obtained. He believed that Böhler was the first to make a determined effort to reduce fractures of the os calcis.

Mr. A. DICKSON WRIGHT emphasised the importance of overcoming the tendency to œdema in fractures of the leg, if disability due to stiffness and ulceration were to be avoided. For this purpose he advocated Viscopaste or Elastoplast bandages.

The PRESIDENT asked how far the treatment of crush fractures of the spine, advocated by Mr. Watson Jones, prevented paraplegia. He also inquired whether Böhler's methods had appreciably shortened the period of disability for work of those who had sustained fractures.

Mr. WATSON JONES, in his reply, said he preferred general to local anæsthesia. Immediate reduction of fractures of the spine and retention in the hyper-extended position led to recovery from paraplegia in the cases where it was due to a contusion of the cord, but not, of course, in the cases where the cord had been extensively damaged. The methods of fracture treatment he had described did quite definitely lead to an earlier return to work. He quoted the experience of one insurance company in regard to Colles's fracture. Since this firm had had all these cases treated by consultants at its own expense, the cost per head had dropped from £426 to £26, and the period of disability, instead of being five months, was four and a half weeks.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY

AT a meeting of this society on April 7th, with Dr. JULIUS BURNFORD, the president, in the chair, a demonstration of

Osteopathic Methods

was given by Dr. THOMAS MARLIN. Manipulative skill, Dr. Marlin said, was not to be acquired by reading, though it might be acquired by watching other people's methods. There were innumerable things to be learned—as, for example, the position of the patient, the amount and direction of force exercised, and the velocity of the movement applied. There was a knack in it, just as there was a knack in turning a key in a refractory lock. He began his demonstration by illustrating the grip-hold on the scapula, which was of great use in the treatment of stiff shoulders. Before any joint manipulation was done there must be complete relaxation of the soft tissues. Another useful manipulation was the occiput pull in headache, which he had found effective in all kinds of headaches except in migraine. Inhibition of the phrenic nerve was often effective in stopping hiccup. He next demonstrated a manipulation for the ankle to extend the ankle-joint. In all work on the foot the task of physiotherapy was to overcome contraction of the tendo Achillis. He showed a manipulation whereby the knee was flexed and the manipulator's arm was inserted in the angle of the leg and thigh, the manipulator's hand pushing against the ankle. He also showed a number of manipulations of the spine, mentioning that the region more easy than any other to manipulate was the upper dorsal. He then carried out a demonstration of a balancing manipulation of the sacro-iliac joint, and of the strap technique for manipulating the cartilage of the knee. As for the mechanism at work in these manipulations, was it not possibly a deep massage on the joint surfaces? If there was anything out of place, Nature was all the time trying to put it straight, and at the moment of separation due to the manipulation a chance was given for the return of the parts to their proper alignment. Often the X ray picture showed no alteration after manipulation, and yet the contracted tissue around the joint had evidently disappeared and there was no longer any spasm.

Mr. W. MCADAM ECCLES remarked that there was nothing new under the sun. Even such straps as had been shown that evening were used when he was a student in many fixed and badly dislocated joints. In those days, owing to the fact that brute force was often in evidence rather than scientific skill, broken bones not infrequently resulted. The scapula grip was known and used in England as long ago as 1890. It was not the shoulder-joint that was wrong in many of these cases, but the pre-scapular tissue. As for the occipital pull, there should be careful diagnosis before this was employed; he had seen it used vigorously for months in a patient who was afterwards proved to have been suffering from intracranial tumour, so that valuable time was lost. In pressure on the phrenic nerve it was necessary to be careful not to excite bilaterally the vagus nerve. In dealing with the ankle-joint, the first necessity was to make perfectly certain that there was not a fractured bone, which had to be dealt with differently from a sprain tearing the soft tissues. Mere pulling on the foot would never reduce a fracture dislocation, not would it give the separation of joint surfaces. What was really concerned was the separation of articular cartilages rather than bone. That was the primary thing to be brought about in these cases where there was said to be adhesions inside the joint. The bone he had to pick with osteopaths was that they would not speak anatomically. There was some excuse in his own student days, when there was no X ray method of examination, but now the movements of the joints could be observed on the fluorescent screen, and the muscles actuating them were known.

Dr. MORTON SMART related experiences with osteopaths and their claims.—Dr. L. CAPPER-JOHNSON thought that some of the small manipulations and corrections which Dr. Marlin had carried out could be done quite easily by general practitioners, and it was unlikely that harm would result in any case.—Mr. VAUGHAN PENDRED expressed scepticism about the osteopath's frequent statements as to the "dislocation of the spine."—Dr. H. H. MILLS thought it very necessary, in carrying out these manipulative movements, to go a little further into the study of the pathology of injuries.—Dr. HEWITSON asked Dr. Marlin how he would deal with tennis-elbow.—Dr. W. S. C. COPEMAN said that when a patient was disabled by some lesion, which he chose to describe as a dislocation, and was cured by the osteopath and not by the doctor, it was time the profession looked into the matter. Often cases were diagnosed as rheumatism and ineffectively treated, afterwards going to the osteopath, who achieved some success.—Mr. G. B. WOODD WALKER asked what manipulations were of use in lesions of the jaw.—Dr. CLEMENT NICORY felt that osteopaths attempted too much to treat every departure from health by one method. Certain definite indications in manipulation of the spine had been found useful as a result of experience.—Dr. DONALD BARLOW said that one of the greatest difficulties in respect to osteopaths was that of correlating their terminology with their results.—Dr. A. CAWADIAS thought it possible that osteopaths might have determined some of the reflex zones and have exploited their reactions. Physicians thought it beneath them to use their hands, yet the hand had a sort of psychological effect on the patient.

Dr. MARLIN, in reply, said that he had been, by manipulation, able to help people who had had long-standing constipation and asthma. The use of the hands in treatment was very important. There were men engaged in practice who appeared to have no "feel" in their hands. The contact unconsciously made the patient antagonistic. Sympathetic hands were needed. There were no manipulative methods of value in treatment of the jaw; the best remedy was diathermy. As for tennis-elbow, osteopaths said that this was due to a rotation of the head of the radius, and, working on that assumption, it was possible to evolve a suitable manipulation, which he proceeded to demonstrate.

LIVERPOOL MEDICAL INSTITUTION

AT a pathological meeting of this institution on April 6th, with Dr. H. R. HURTER, the president, in the chair, a paper on the

Clinical Significance of Calcium

was read by Dr. R. W. BROOKFIELD. After a general review of the metabolism of calcium he described some of his own work on the subject. Injection of a magnesium salt, he had found, caused a prompt lowering of the serum calcium, and in rabbits there was a distinct inverse relationship between the

magnesium and calcium of the serum when the figures for the two elements were followed from day to day. Calcium was best absorbed in the interdigestive period when the reaction of the upper intestinal tract was slightly acid, and its availability to the tissues was favoured by the simultaneous exhibition of ammonium chloride. Of the preparations available in therapeutics, calcium gluconate and calcium lævulinate were commended because of their solubility and freedom from irritant effects when given either by mouth or subcutaneously. Many failures to produce the desired effects were attributable to inadequate dosage. The usefulness of the parathyroid hormone was strictly limited because it raised the serum calcium only at the expense of the calcium reserves in the skeleton. In the hands of some clinicians, Dr. Brookfield said, calcium had proved of value in the treatment of inflammatory and other effusions, allergic conditions, and chilblains. In jaundice it seemed to be of definite value in minimising bleeding at operation, and work by Minot and Cutler on acute yellow atrophy produced by carbon tetrachloride indicated that intensive calcium therapy was likely to find an extremely useful application to toxic hepatic disorders generally.

Dr. G. GRAHAM MACPHEE cited the work of Kay and Guyatt of Toronto. They found, he said, that rats fed on a McCollum stock diet which did not cause rickets could be made to develop rickets by the simple addition of beryllium carbonate to the diet. The addition of beryllium phosphate did not cause rickets. Their explanation of the production of this so-called beryllium rickets by giving the carbonate and not the phosphate was that the phosphate is an insoluble salt, and is excreted unchanged from the bowel, whereas beryllium carbonate is converted into beryllium phosphate, thereby using up some of the animal's store of phosphorus and upsetting the phosphorus-calcium ratio, with the result that rickets ensues. The fact that no beryllium was found to be stored in the animal's bones or body supported this. The question arose whether phosphorus was not the chief regulator in calcium metabolism.

Dr. C. ALLAN BIRCH said that although many clinical pictures were associated with a low serum calcium, it was a striking fact that so far only two conditions (hyperparathyroidism and excessive ultraviolet radiation) were known to have a high serum calcium. In these conditions the high serum calcium was not itself responsible for the disease, and Dr. Birch inquired if there was any syndrome known which could be ascribed to a hypercalcæmia itself.

Dr. R. H. MOLE emphasised the close relationship of the endocrine glands to the metabolism of phosphorus and calcium, instancing the mobilisation of calcium by parathyroid hormone, the rarefaction of bone due to thyroid hormone in exophthalmic goitre, and the diminution of blood phosphorus with rise of blood calcium due to insulin injections.

Dr. EDNA MAWSON said that recent experimental work on hypervitaminosis D suggested that, although overdoses of vitamin D might raise the blood calcium, other factors were concerned in the production of calcium phosphate calculi in the genito-urinary tract. Certain investigators had recorded that they were unable to produce calculi by feeding rats on large quantities of irradiated ergosterol if the diet contained vitamin A. A little milk added to the diet daily would prevent their formation. Dr. Mawson said that this might cast some light on the geographical distribution of stone. In the East calcium phosphate calculi were common among badly fed native children, but were almost unknown among well-fed European children who were exposed to similar climatic conditions.

REVIEWS AND NOTICES OF BOOKS

The Heart Rate

By ERNST P. BOAS, M.D., Associate Physician, Mount Sinai Hospital, New York City; and ERNST P. GOLDSCHMIDT, Ph.D., Research Fellow (1930–31), Department of Surgery in the Yale University School of Medicine. London: Baillière, Tindall and Cox. 1932. Pp. 166. 18*s*. 6*d*.

IN 1850 Volkmann said: "Counting the pulse of persons whose previous rate is unknown is worthless for the diagnosis and treatment of disease, and the use of the second watch at the sick bed approaches charlatanism unless one takes pains to inquire into the many circumstances on which the pulse-rate is so very dependent." The wisdom of this remark becomes manifest to a reader of this book before he has turned many pages, and as he reads on he will be more and more aware of the shortcomings of our present arbitrary methods of taking pulse-rates, of the inaccuracy of our conceptions of the normal heart-rate. As the authors point out, the heart beats from 90,000–110,000 times in the 24 hours, and yet we are content to estimate its rate from one minute's observation, often under strange and disturbing conditions, and when the subject is conscious of our intent. The obstacle in the way of getting a continuous record of the heart beat has always been the difficulty in finding an instrument sufficiently sensitive and yet sufficiently stable to record the heart beats over a long period of time while the subject is carrying on his normal activities.

Such an instrument, the cardiotachometer, has been invented by Dr. Boas and Dr. Goldschmidt, and the results of their observations are here set out. The work is divided into two parts: (1) a study of the normal heart, and (2) a clinical section which includes a study of the heart-rate during anæsthesia and operations, and in disease. The opening chapter is devoted to a historical survey, followed by a chapter describing the cardiotachometer and its method of use. The section on the heart-rate in normal people is based on records taken from 51 men and 52 women between the ages of 20 and 40 on whom continuous records have been taken for periods of 12–24 hours. In the chapter on the correlation between the heart-rate and certain body measurements it is stated that the systolic blood pressure bears no direct relation to the heart-rate, but that the lower rates are associated with lower diastolic pressures, probably due, as the authors say, to the longer diastole which allows more time for the emptying of the arterial tree. In examinations of the heart-rate during anæsthesia and operations no correlation was found between rate and blood pressure during operations. Sometimes a rise in pulse-rate was accompanied by a rise in systolic pressure, but, on the other hand, a dangerous fall in pressure could take place without any corresponding increase in rate. The clinical section includes cardiotachometric studies of the heart-rate in cardiac insufficiency, valvular disease, myocarditis, Graves's disease, neurogenic sinus tachycardia, auricular fibrillation, and complete heart-block. Probably the most helpful work here described is that done on the so-called neurogenic sinus

tachycardia cases. The problem of assessing the significance of an obscure tachycardia will be far less difficult to solve if we can be assured that tachycardias of neurogenic and psychogenic origin disappear during sleep, whereas other tachycardias, for example, those caused by an abnormal condition of the thyroid gland, do not. Special stress is laid on the value of sleep in cardiac disease, following observations of the normal heart during sleep, and the consideration that in disease as in health the heart-rate during sleep is an index of the speed at which the heart must beat to meet the physiologic needs of the individual.

The book is of real value to clinical medicine. It is generously illustrated with tables and graphs, and has an extensive bibliography.

Précis de l'ionothérapie électrique

By Dr. F. GIDON, Professor at the School of Medicine, Caen. Paris: Éditions des Laboratoires Clin. 1932. Pp. 92. Fr.15.

IN this little book are described the principles which underlie medical ionisation, the necessary apparatus, and the maladies suitable for treatment. Many workers who are familiar with the subject maintain that ions introduced through the agency of the galvanic current do not reach the tissues which are more than a slight depth below the skin and, for this reason, are unable to exert their therapeutic properties on parts other than the skin and superficial fascia. Dr. Gidon, however, believes that ions introduced in the way mentioned reach organs such as joints and muscles, which lie under the deep fascia, not by means of the electric current, but by way of the blood and lymph capillaries. He thinks that the passage of the ions into the deeper parts is aided by muscular movement, and he actually uses the faradic current in combination with the galvanic for the purpose of procuring this movement. According to this hypothesis ionisation is a form of treatment in which the superficial fascia above or around a diseased part is stored with therapeutic ions which gradually make their way to the underlying parts by way of the lymph and blood capillaries. Dr. Gidon calls attention to the fact that ions introduced through the agency of the galvanic current are excreted much more slowly than similar ions taken by way of the alimentary canal.

Practitioner's Library of Medicine and Surgery

Vol. III.: *Practice of Medicine*. By Many Authors. Associate Editor, H. M. MARVIN, M.D., Assistant Professor of Medicine, Yale University. London: D. Appleton and Co. 1933. Pp. 1400. 50*s*.

THIS volume, the third of the series, differs in some respects from most English text-books on medicine. Though the book contains some 1400 pages, diseases of the nervous system are omitted, presumably to appear in a further volume. On the other hand, a large number of conditions are described which are not usually found in the smaller standard works. The authors have in this sense succeeded in producing a comprehensive account of modern internal medicine, and there can be very few of even the rare diseases that are not included. As the editor, however, acknowledges, the emphasis on various diseases is "not exactly that to which the reader is accustomed." We thus find, for example, a bare two pages each devoted to primary new growths of the lung, *B. coli*, pyelitis, and duodenal ulcer; as much space as this is allotted to hæmochromatosis, and more is given to a theoretical discussion of calcium and phosphorus metabolism. In the treatment of gastric ulcer, diet is dismissed in some ten lines, whilst nearly two pages are devoted to menus suitable for the treatment of diarrhoea due to intestinal flagellates such as *Giardia lamblia*. A full description of the clinical features, diagnosis and treatment of such a common condition as bronchial asthma is difficult to find, though an excellent general account of allergy is given with numerous examples of possible sensitising agents. The emphasis is truly not that to which an experienced reader is accustomed and is hardly adjusted to the needs of the student. The editor's wish, to make "the material easily available" has not been entirely fulfilled, and in places there seems to be a lack of definite detailed instruction, particularly in regard to treatment. On the other hand, this volume has certainly been kept "free from confusing discussions of unsettled though possibly interesting problems." The omission of subjects such as the use of sanocrysin in the treatment or of the red cell sedimentation test in the prognosis of pulmonary tuberculosis is however hardly justifiable. Some of the different allocations of space may be attributable to the different incidence of disease in America and in England.

Pharmacology and Therapeutics

An Introduction to Pharmacology and Therapeutics. Third edition. By J. A. GUNN, M.A., M.D., D.Sc., F.R.C.P., Professor of Pharmacology in the University of Oxford, and Fellow of Balliol College. London: Humphrey Milford, Oxford University Press. 1932. Pp. 237. 5*s*.

SINCE this edition was called for only a year after its predecessor few radical changes have been required in the text. Prof. Gunn has, however, made some alterations in accord with the British Pharmacopœia, 1932. The chief addition is a short exposition of the facts of immunity which should enable the beginner to understand the rationale of the actions and uses of vaccines, antitoxins, and serums, now become official preparations. The book provides a comprehensive survey of the main facts of pharmacology, and is one which every student ought to possess.

Care of the Nose, Throat, and Ear

Third edition. By W. STUART-LOW, F.R.C.S. Eng., Consulting Surgeon to the Central London Throat, Nose and Ear Hospital. London: Baillière, Tindall and Cox. 1933. Pp. 99. 5*s*.

THIS little book has been written for the general public, and the fact that it has reached a third edition is evidence that there are a number of people who desire a smattering of knowledge of diseases of the nose, throat, and ear. In a work of this kind, almost necessarily dogmatic, it is easy to fall into exaggeration and over-statement, and the author has not escaped this pitfall. When reviewing the second edition four years ago we took exception to several of these over-statements, and we regret to see that they have not been modified. They include the following: "If the nose is blown properly when a cold in the head is in its early stages its development can be stopped"; "the nose is at fault in all such cases (of asthma), and should have skilled examination and attention to effect a cure, which can be brought about in all instances"; and "it is now recognised that a large majority, if not all cases of asthma, are dependent upon some obstruction or disturbing condition of the nasal cavity." Such exaggerations damage the value of the book as a reliable guide for the laity.

THE LANCET

LONDON: SATURDAY, APRIL 22, 1933

PURE PATHOLOGY

ALTHOUGH bacteriology is largely a medical science, there are those even among medical bacteriologists who are more interested in bacteria than in infectious diseases. Bacteriology has, in fact, developed an academic side whose devotees have little interest in the patient except in his capacity of host. Few will be found to decry this development, for clinical bacteriology cannot fail to derive benefit from it in the long run. The mother science of pathology, on the other hand, has up to now remained wedded to the patient and has been content with the narrow bounds of a Victorian domesticity, much to the amusement of her cousin physiology, who has long ceased to be faithful to a human attachment. Signs are not wanting, however, that pathology is beginning to desire a freer life and a wider field than is offered by the hospital laboratory and post-mortem room. It is true that pathologists have always extended their investigations to the lower animals, and experimental cancer research, to name only one branch of pathological endeavour, has shown what possibilities lie in this direction. But these activities have invariably had a utilitarian basis, and their ultimate object has been the conquest of human disease. Now, while there are those whose immediate reaction to a morbid lesion is a desire to abolish it, there are others to whom the study of disease processes is an end in itself. To them the reactions of the cells and tissues to adverse influences, and alterations in the vital functions of the body, form just a branch of biology to be studied with no other object than the attainment of knowledge. Such a point of view was the inevitable outcome of the enormously enhanced interest in medical research which the last 20 years have witnessed, and there is no doubt that it is to be encouraged—the forces which bind pathologists to the study of human disease are so strong that there is no danger that the progress of clinical medicine will suffer by the defection of a few enthusiasts. It is inconceivable that pathologists as a whole will ever in their convivial moments honour the toast of "Pure Pathology, and may it never be of any use to anyone." Nor need there be any apprehension that medical education will suffer if the academic pathologist demands, as he certainly will, disciples to whom he may teach his science.

On the other hand there is a strong body of opinion which holds that much of the teaching in pathology which is usually presented to the student in his clinical years would be more usefully given in an earlier part of the course and in association with biology and physiology. Our present system creates a gap between pathology and the ancillary sciences which is both unnecessary and illogical, and deliberately emphasises the difference between the normal and the abnormal rather than their likeness to each other. That the study of the general processes of disease can be carried on apart from clinical work has been demonstrated at Cambridge, where an honours course in general pathology and bacteriology has been successfully conducted for several years; and there seems no reason why something of the same kind should not be introduced into medical schools directly attached to hospitals. The field to be covered should be carefully selected with a view to the illustration of fundamental processes; the study of lesions as such should be rigidly excluded, for this rightly belongs to a later part of the curriculum. This is not to say that the post-mortem room and the museum are of no value to the student in his earlier years, for as every teacher of morbid anatomy knows there are two points of view to every autopsy: the lesions from which the patient suffered and their bearing on his clinical history, and the processes of disease which his lesions illustrate. But a course in academic or experimental pathology fails in its object if it chiefly consists in the reproduction in the laboratory animal of the lesions of human disease. This is the criticism which is aroused by the perusal of a recently published handbook on a course of experimental pathology which is given to second-year students in the School of Medicine of the University of Pennsylvania.

Such a course would in our view be undesirable in this country, quite apart from the difficulty of finding time for it in our crowded curriculum; for although it is not suggested that all the experiments described should necessarily be performed by the student, to work through even a moderate selection of them would occupy many weeks. Then, although many experiments are described which are designed to illustrate general pathological principles, a great deal of the course seems to be devoted to the production of lesions in laboratory animals. The experiments demand a degree of technical and operative skill which the student can scarcely be expected to possess, or to acquire, at this period of his career. Moreover, it is unlikely that the Home Office would include such procedures under the terms of the Vivisection Act. In fact, that part of the course intended to illustrate the study of special pathology does not seem to have been very skilfully devised. It gives the impression that the authors have combed the literature of pathological research to find experiments which can be repeated with a fair hope of success instead of laying down a logical sequence of observations. The work is too utilitarian and disconnected to be of general educative value, and the student would be more usefully employed in studying from every aspect actual human lesions rather than those produced in animals.

CARBOHYDRATES AND FATIGUE-RECOVERY

IT has been repeatedly shown that different carbohydrates have a different rate of absorption from the alimentary tract. ARIYAMA and TARHASI [1] have recently reported investigations on rats from which they give the relative assimilation values of maltose, sucrose, and maltose plus sucrose as 1·50, 0·76, and 0·98 respectively, whilst C. F. CORI [2] has found with great regularity that when two such substances were fed simultaneously the rate of absorption of each was reduced. Since active exercise is accompanied by the utilisation of carbohydrate and depletion of the available glycogen reserves, it is to be expected that ingested carbohydrate will aid recovery from fatigue, and that the fatigue-recovery value of the particular carbohydrate used will bear some relation to its rate of absorption. Dr. DONALD A. LAIRD, director of the Colgate University Psychological Laboratory, reports [3] a series of investigations carried out on eight healthy young men with the purpose of determining the relative fatigue-recovery values of two preparations, one containing 70 per cent. maltose, the other a mixture of 20 per cent. maltose and 48 per cent. sucrose. Control values were obtained when no carbohydrate was administered. The subjects reported to the laboratory at the same time each day, and carried out a series of "before exercise" performance tests, this testing providing a base line or reference point from which the fatigue effects of the exercise could be charted. Each subject then drank two ounces of the carbohydrate preparation in milk, and one hour later underwent a period of fatiguing exercise, followed by a repetition of the performance tests. Two weeks were spent in preliminary training to eliminate as far as possible the effect of proficiency on the comparison. The five tests adopted (which were carried out in the same sequence each day) were: the speed of tapping on the standard tapping-board (to measure the speed and agility of coördinated muscular movements of the hand and forearm), the Scott 3-hole test for the measurement of more agile coördination, the tracing-board for the measurement of dynamic or active coördination, the plate-test for measuring static steadiness, and the hand dynamometer for measuring the strength of grip in kilogrammes. In comparing results (which the tests recorded in seconds and kilogrammes) a common denominator of 100 was taken to represent the initial performance in each case on any day before the fatiguing exercise, and the subsequent values related to this. In the interpretation of the results, Dr. LAIRD has combined the indices for the first two steadiness tests, which indicate that there is most decline in steadiness following exercise on the days when no special diet was employed one hour previously; that there was least decline in steadiness when the 70 per cent. maltose diet was given; and that the mixture of maltose and sucrose produced some improvement over "no special diet," but considerably less than the 70 per cent. maltose diet. The results for strength of grip, agile dexterity, and speed of tapping were similarly combined, since in these three tests there is fatigue within the test itself, shown by decline in performance from the first to last successive trial before and after exercise. Here again most resistance to the effects of fatigue on these functions was shown on those days on which the 70 per cent. maltose diet was administered. The maltose and sucrose mixture, however, does not appear to cause any improvement in the performance over that of the days on which no special diet was given. The detailed records of each individual tested show almost without exception the superiority of the maltose in hastening recovery.

[1] Biochem. Zeitschr., 1929, ccxvi., 269.
[2] Proc. Soc. Exp. Biol. Med., 1926, lxx., 577.
[3] Jour. Indust. Hyg., March, 1933, p. 89.

UNEMPLOYMENT AND HOME LIFE

ALTHOUGH depression, suspicion, and resentment are the fruit of unemployment, yet, as we had recent occasion to point out,[1] neuroses are seldom found when there has not been a definite disposition to such disorders. A parallel may be drawn between the present situation and that which existed during the late war, with its prolonged and almost intolerable stresses to which many proved unable to adapt themselves; and it is well known that the existence and extent of a previous disposition to breakdown determines the degree of a man's resistance to those stresses. This disposition has now been studied in the light of psychopathology, and although something that we call temperament may be inborn yet it is recognised that adjustment of temperament to the demands of life must be accomplished in the early years, and that upon a failure in that adjustment depends the disposition to later breakdown. That the foundations of character are laid in childhood is an ancient observation; medicine has taken a roundabout route to discover that the psychoneuroses rest upon a similar basis.

The effects of war conditions upon the emotional development of the child are not capable of measurement, and judgments passed by the elder upon the younger generation have generally a tendency towards pessimism that renders them suspect. That the absence on war service of the disciplinary father led to deterioration of the child is a belief in what ought to have happened rather than a fact of observation. We do know, however, that character defects and psychoneurotic tendencies in the child depend in a subtle way upon emotional relationships between the parents, and a hard life, even poverty, may have a favourable outcome if those relationships run smoothly. For this reason it is disturbing to find that unemployment has a worse effect generally upon home life than anything we were familiar with during the war. That this happens we learn from a brochure,[2] issued by the Save the Children International Union, describing the effect of

[1] THE LANCET, Feb. 11th, p. 311.
[2] Children, Young People, and Unemployment. Part I. The Save the Children International Union, 15, Rue Lévrier, Geneva, Switzerland.

unemployment upon children and young people in Germany, the United States, Belgium, and Switzerland. That health should suffer, and with it the capacity for effort and concentration, is to be expected; the report gives ample evidence of underfeeding and semi-starvation both in Germany and the United States. Some obvious mental reactions, too, may be expected from adolescents, ranging from apathy and self-neglect to antisocial sentiments and membership of extremist political parties. But the worst result seems to be the destruction of family happiness that accompanies the continued unemployment of the one who is normally the bread-winner. The wife, or even the child, may earn a little, and the father becomes sensitive or nervous, or endeavours by brute force to maintain or regain his authority. Broken homes and desertion increase. An American observer writes:—

"Criticising, resentful, sullen husbands; nagging, railing, contentious wives; hypercritical, unsympathetic attitudes on the part of other members of the family towards one another; harshness and sternness with the children; bitterness, cynicism, and antagonism against society and the Government—such are some of the human costs of the depression. Each one of these reactions carries with it a threat to the mental health of the individual and of the community."

Examples of family solidarity different from this picture are given in the report, but even that solidarity involves a strain that may leave a scar. At the onset of their unemployment youths may be tolerated at home, but after a while are regarded as so many superfluous mouths. Natural ties yield to conflicts and jealousy, and even when the family spirit is strong the young people may feel that they can help the family better by their absence than by their presence. We cannot suppose that these descriptions would not apply to many of the homes of our own unemployed, and in this country voluntary bodies, even the unemployed themselves, are organising occupation for the unfortunate victims of the times, whilst we are realising that more than a mere physical sustenance is needed to maintain the mental equilibrium of unemployed youth. Child welfare societies care for the bodily needs of younger children, but the preservation of reasonably happy home conditions is necessary if we are to save the very youngest from the risk of growing up emotionally warped and permanently incapable of social adjustment.

ANNOTATIONS

INTRACRANIAL PRESSURE IN EPILEPSY

THE presence of dilated subarachnoid spaces, the loss of extracellular water during convulsions, the fact that an increased water-intake combined with injections of pituitrin often precipitates fits, and the freedom from convulsions during periods of extreme fluid restriction—these are all circumstances which suggest that epilepsy may be partly an expression of disturbed fluid metabolism. Circumstantial evidence, however, must be interpreted with some caution. It does not follow from the fact that dementia paralytica is sometimes relieved by artificially induced pyrexia, or auricular fibrillation by digitalis, that the former is due to an abnormally low body temperature, or the latter to a deficiency of digitalis in the diet. Yet simple fallacies of this kind have been overlooked by those who maintain that epileptic convulsions are caused by recurrent cerebral œdema, and as far as direct evidence is concerned their case makes somewhat unconvincing reading. Some experiments now reported by F. Fremont-Smith and H. H. Merritt[1] emphasise the wisdom of reserving judgment on this question. They find that considerable increases in the fluid intake do not measurably raise the intracranial pressure in epileptics. The kidneys effectually dispose of the excess water and the body-weight does not rise. If, however, the kidneys are at the same time disabled by injections of pituitrin, the intracranial pressure rises, apparently as a result of dilution of the plasma. On the other hand fluid restriction does not lower the tension of the cerebro-spinal fluid unless it is severe enough to cause dehydration and a loss of body-weight. The most significant finding, however, is that in spite of the absence of change in intracranial pressure, the incidence of convulsions is greater when the fluid intake is high and less during periods of fluid restriction. It is evident, then, that the pernicious effects of excessive fluid intake and the benefits of dehydration in epilepsy are not referable to changes in intracranial pressure, nor, as further data show, to alterations in the volume of the cerebro-spinal fluid. The work of Fremont-Smith and Merritt, in fact, gives no support to the hypothesis that epilepsy is due to cerebral œdema, and merely confirms the belief that artificial alterations in fluid exchange may modify the incidence of convulsions. The explanation of this fact can only be surmised. The response of tissues such as the heart muscle to physiological stimuli can be altered by changing the composition of the fluid which bathes them, and nervous tissue is probably sensitive to similar changes. If the response of the neurone to pathological stimuli is likewise conditioned by its environment, then variation in water metabolism in epilepsy may reasonably be dismissed as a subsidiary factor and should not be regarded as the actual cause of the convulsion.

[1] Arch. Neurol. and Psychiat., March, 1933, p. 454.

WITCHCRAFT AND HUNTINGTON'S CHOREA

BELIEF in witchcraft has its roots in the fundamental terror with which mankind faces the unknown. From the intolerable witches of Apuleius to Thrawn Janet, hanging from a thread of worsted, literature is studded with accounts of those in league with the powers of darkness. And so recent is this belief in possession that it is barely a hundred years since a woman was put to death for witchcraft in England. Of all diseases likely to procure for the victim a reputation for sorcery, Huntington's chorea was surely the most apt. What could be more natural than to attribute its strange, purposeless movements to the antics of a familiar spirit in the body? As the malady progressed the supposed witch became more and more ill-tempered and malicious, making enemies of all her neighbours, until she established herself inevitably as the first suspect at the next witch-hunt. In a fascinating study[1] Dr. P. R. Vessie of Greenwich, Connecticut,

[1] Jour. Nerv. and Ment. Dis., 1932, lxxvi., 553.

traces the transmission of Huntington's chorea in America for three hundred years from a group of three men and their wives, emigrants from the village of Bures in Suffolk in the year 1630. We may congratulate ourselves on their loss, for though Bures to-day offers no examples of an interesting disease, there can be no doubt that Wilkie, Nichols, and Jeffers and their progeny were undesirable characters, and would nowadays be classified as belonging to the social problem group. New England, more austerely, took most of them for witches. Wilkie and Nichols were brothers, and their family became linked with that of Jeffers by marriage. The pedigree chart compiled by Dr. Vessie shows not only the members afflicted with chorea but those tried in colonial courts for misconduct or witchcraft. His brief quotations from the records of the day are keyholes through which the reader catches a glimpse of unbearable ignorance and cruelty. He tells how, at the hanging of the wife of Nichols, a young woman called Mary Staplies had the courage to examine the body for witch marks and to declare roundly that the dead woman was no more a witch than she was herself. For this piece of common sense she was in turn indicted as a witch. Irving Lyon described the essential features of the disease in 1863, but it bears Huntington's name from the fuller account which George Huntington gave of it in 1872; he saw his first cases when riding with his father while he was still a boy, and later described how they came upon two women, "twisting, bowing, grimacing," and how he stood "in wonderment, almost in fear." Both his father and his grandfather had become familiar with the disease in the course of their professional experience. It is transmitted directly from parent to child, and is associated with atrophic changes in the corpus striatum and cerebral cortex, the symptoms developing in adult life. Even Dr. Vessie, in the present year of grace, refers to the "diabolical evolution" of the disease, and it is not difficult to concede something devilish in a condition so relentless.

BRONCHIECTASIS IN PULMONARY TUBERCULOSIS

BRONCHIECTASIS is too often regarded as a disease sui generis, as if it were a form of bronchial inflammation due to more or less specific parasites or organisms. But the bronchial tree cannot be conveniently separated from its anatomical surroundings in this way. When we consider the pathology of pulmonary tuberculosis it would indeed be surprising if the bronchial walls were unaffected by the tuberculous infiltration and ulceration which is going on around them, and indeed they are not. Pulmonary tuberculosis is often associated with a greater or less degree of bronchial dilatation; it is indeed one of the common causes of bronchiectasis, though this has been almost forgotten. Clinicians of an older generation, whose study of post-mortem material was perhaps more careful because the autopsy chamber represented their only special department, were well aware of the connexion. It may well be that one of the reasons why attention has been withdrawn from the study of the bronchi in tuberculous conditions is the introduction of lipiodol. It is usually considered undesirable to employ lipiodol in pulmonary tuberculosis on account of its supposed congestive action. As a consequence, while all other bronchiectatic conditions have been the subject of careful radiographic study, tuberculous bronchiectasis has been neglected. It is no doubt undesirable to inject a foreign substance—even an oil as bland as lipiodol—into bronchi adjoining or taking part in active tuberculous disease, but there is no reason to suppose that lipiodol has any deleterious action in chronic phthisis. Its judicious employment by Dr. A. Dufourt and Dr. P. Etienne-Martin and his colleagues at Lyon has resulted in an illuminating study of bronchial dilatation in pulmonary tuberculosis,[1] which has led them to pay tribute to Grancher's work on the subject only half a century ago.[2]

Léon Bernard [3] has distinguished three groups of tuberculous bronchiectasis: (1) secondary to certain acute tuberculous processes including lesions of "spleno-medullary" or "epituberculous" type; (2) accompanying fibrocaseous disease; (3) associated with the more chronic forms of fibroid phthisis. It is surprising to learn that bronchiectasis has been observed at Lyon after lesions of acute benign type, for as a rule whether the lung clouding observed in radiograms of this condition is due to atelectasis the result of pressure from an enlarged bronchial gland, to a non-specific response around a tuberculous focus, or to an area of tuberculous broncho-pneumonia, more or less complete resolution is the rule, and any evidence of consequent fibrosis is slight. Such a sequel has not been noted in any of the cases reported by English writers. Bronchial dilatations following fibrocaseous disease seldom form an important part of the pathological picture, but some degree of bronchiectasis is not uncommon in the vicinity of cavities. Sometimes, as Dufourt and Etienne-Martin have demonstrated, lipiodol may show a bunch of glove-finger dilatations pendant below a large vomica, and a similar process may involve the whole of a lower lobe when the upper lobe is excavated. Advanced types of bronchiectasis are, however, best seen in the more chronic forms of fibrosis, and the massive scarring which sometimes follows a prolonged course of artificial pneumothorax treatment is a possible cause.

Recent research has thus proved that Grancher was correct in attributing to tuberculosis an important rôle in the production of bronchiectasis. It should not be forgotten, however, that though the latter may result from the former, bronchiectasis may precede a tuberculous infection of a damaged lung. Bronchiectatic cavities are the breeding places of a multiplicity of organisms among which a few tubercle bacilli may obtain a lodgment. But the conditions in which they find themselves are usually unfavourable to their development, and this probably explains the occasional expectoration of Koch's bacilli by patients who are suffering from bronchiectasis, and reveal no other evidence of tuberculous disease.

HAFFKINE'S PLAGUE VACCINE

IN a recent monograph[4] Lieut.-Colonel J. Taylor, I.M.S., director of the Haffkine Institute in Bombay, describes the origin and development of the vaccine introduced by Haffkine for the prevention of plague, and the results obtained with it. Plague was first recognised in Bombay in Sept., 1896, and within three months Haffkine had succeeded in protecting rabbits against a virulent culture by injecting them subcutaneously with a broth culture of *B. pestis* killed by heat. Haffkine next tried this vaccine on himself, receiving in the flank 10 c.cm. of a broth culture of *B. pestis* sterilized by exposure for an hour to 70° C. There was some local pain and a rise of temperature to 102° F., but this soon passed off and the experiment demonstrated that the pro-

[1] Arch. Méd. Chir. de l'Appareil Resp., 1932, vii., 310.
[2] Gaz. Méd. de Paris, No. 146, April, 1878.
[3] Bronchiectasie et Tuberculose, Paris Méd., Sept. 28th, 1929, p. 257.
[4] Indian Medical Research Memoirs, No. 27, March, 1933.

cedure was a fair one for prophylactic trial. This achievement of Haffkine was a very remarkable one; for the plague has continued in India, and his vaccine has undergone no essential variations in principle up to the present day. In an official report dated Jan., 1897, Haffkine stated that "these observations made in the laboratory lead to the conclusion that the inoculation as described above will increase the resistance of man against the plague. But the extent of that protection, and the modifications to be introduced in the method for the object of increasing that protection, can be shown only by observation on man during the epidemic." The prediction that resistance to the plague would be increased by the vaccine has been abundantly justified by its success in well controlled and often repeated observations carried out for many years past during outbreaks in India. A still further tribute to the skill and perspicacity of Haffkine lies in the assurance given by the director of the institute named after him that in almost every point Haffkine had adopted the methods which, 36 years later, have been found to produce a vaccine of the highest antigenic value. From all the available statistical evidence Col. Taylor concludes that inoculation with Haffkine's plague prophylactic gives a fourfold protection against attacks, and an eightfold protection against death.

KETOGENIC DIET IN THE TREATMENT OF PYURIA

SINCE 1931, when Clark and Helmholz described their observations on the bacteriostatic and bactericidal effect of the urine of patients on a ketogenic diet,[1] a considerable number of reports have appeared in this country and elsewhere. In one of the latest Dr. J. B. Rennie[2] records investigations on six cases of chronic pyuria in childhood. The renal function of each case was tested on admission with regard to the ability to excrete phenolsulphophthalein and to concentrate urea; the non-protein nitrogen of the blood was estimated and intravenous pyelography performed. The patients were put on a diet having a K : AK ratio of 2 : 1 which was rapidly increased to 5 : 1 or even 6 : 1, the duration of the course varying from 14 to 22 days. Twenty-four hourly specimens of urine were examined for pH (universal indicator), ketone bodies (Rothera's test), and pus. Cultures of the urine were made on the first and last day of treatment. In all cases the renal function tests showed a poor result, and it is of interest that in the case of the child whose renal function was worst (there having been a considerable fall in the ability to concentrate urea during the lapse of a year), the response to ketogenic diet was very poor both as regards acidity and ketonuria. The urine was sterile and free from pus at the end of the period of treatment in four out of the six cases; two of these appeared to be cured. Of the remaining four cases, three relapsed shortly after the cessation of treatment, and in one case the urine was unaffected by the diet. In three of the uncured cases, intravenous pyelography showed an abnormality of the urinary tract. Rennie concludes that when there is no such abnormality, ketogenic diet probably provides an efficient method of clearing up a urinary infection, but that this method of treatment is of little value when an abnormality of the urinary tract is present.

As to the nature of the bactericidal agent excreted in the urine of patients on a ketogenic diet, Mr. A. T. Fuller, Ph.D., whose results are reported in our present issue, has reached the conclusion that the principal factor involved is *l*-β-oxybutyric acid. By a series of tests on the inhibiting power of the urine on the growth of *Bacillus coli*, he showed that concentration and removal from the concentrate of urea, inorganic salts, phosphatides, proteoses, bases, and amino-acids did not reduce the bacteriostatic activity of the urine. Subsequent removal of lactic acid, and purification of the residual *l*-β-oxybutyric acid showed that the bacteriostatic effect was to be attributed to the latter, a conclusion which was confirmed by the fact that optically inactive β-oxybutyric acid which was synthetically prepared had a similar bacteriostatic action. Fuller's findings support the results of the original workers with regard to the importance of a low pH in the effectiveness of treatment, and show that unlike most antiseptics, the *l*-β-oxybutyric acid is likely to have better bacteriostatic action in vivo than in vitro, because of the continual excretion of an acid urine.

In-vitro experiments have also been carried out by Sogo Tetsumoto[3] on the sterilising action of both mineral acids and saturated monobasic fatty acids (from formic to capric) in relation to putrefactive bacteria, *B. typhosus*, and *Vibrio cholerœ*. He concludes that while mineral acids such as HNO_3, HCl, H_2SO_4, and H_3PO_4 have a stronger sterilising power than any of the above saturated monobasic fatty acids in the same molecular concentration, the sterilising power of the saturated monobasic fatty acids is stronger than that of the mineral acids in the same pH. He also shows that in the same molecular concentration the sterilising power is greater in formic acid (C_1) than in any of the acids from acetic (C_2) to isovaleric (C_5).

EOSINOPHILIA OF UNKNOWN ORIGIN

THE significance of eosinophilia is a problem still awaiting solution. A high eosinophil count is known to occur in association with parasitic infections, especially hydatid infestation, in certain cases of Hodgkin's disease, in skin conditions, and patients showing allergic phenomena, such as asthma or urticaria. Hay and Evans collected[4] a group of cases of apparent eosinophilic leukæmia. A few instances where it appeared to have a familial incidence have been recorded. It is found, however, in patients where no satisfactory diagnosis can be made. Such a case was recently shown by Dr. J. Murphy at a meeting of the Cork Clinical Society. The patient was a man of 39. He complained of loss of weight, weakness, nausea, and epigastric pain. The red cell count was in the neighbourhood of 3,000,000 and the colour-index approximately 1. The red cells showed anisocytosis. Some of the cells were 8–10 microns in diameter. The eosinophil count was as high as 76 per cent., with a total white cell count of 20,000 per c.mm. All examinations for bacterial or parasitic infections were fruitless. The Wassermann reaction was negative; a radiogram of the stomach showed nothing abnormal; apart from pallor and cardiac enlargement with a mitral systolic bruit there were no important physical signs. While under observation the liver became enlarged and there was evening pyrexia. The man improved clinically when treated with quinine, hepatex by intramuscular injection, and ventriculin, though enlargement of the liver persisted. Dr. Murphy suggested a diagnosis of eosinophilic anæmia of pernicious type. Those who

[1] See THE LANCET, 1932, ii., 526.
[2] Arch. Dis. Child., February, 1933, p. 47.
[3] Jap. Jour. Exp. Med., Feb. 20th, pp. 61 and 73.
[4] Hay, J., and Evans, W. H.: Quart. Jour. Med., 1929, xxii., 167.

took part in the discussion suggested the possibility of sarcoma of the bone-marrow, leukæmia of eosinophilic type, developmental anomaly, or pernicious anæmia. In addition to the classical causes already mentioned, eosinophilia is occasionally seen in carcinoma of the lung. Screening in Dr. Murphy's case showed only enlargement of the heart, but it is just possible that radiograms of the chest might have revealed something suggestive of growth.

GOLD SALTS IN RHEUMATOID ARTHRITIS

IT was the similarity between tuberculosis and rheumatoid arthritis which led J. Forestier [1] in 1928 to try the effect of gold salts in the latter disease. Since then they have been used by others, and the general view is that they are of definite value. The two preparations most commonly used are allochrysine (sodium aurothiopropanolsulphonate) and sanocrysin (sodium aurothiosulphate); allochrysine is administered intramuscularly and has thus an advantage over sanocrysin, which is usually given intravenously; although Knud Secher [2] says that he gives it, together with æthocainhydrochloride, intramuscularly without any bad effects.

Before beginning a course of gold injections it is as well to attend to obvious foci of infection. It is an advantage also to do a sedimentation test of the red blood corpuscles and a white cell count, for the changes in these two tests during the course of treatment are helpful in gauging progress. Most patients with active disease show a slight increase of temperature, a moderate leucocytosis, and an increased sedimentation rate. A decrease in the white cell count, and, more important still, a decrease in the sedimentation rate, is a good prognostic sign; and Forestier recommends that the latter test should be at first made at least once a month and later once every two months. As for the methods of giving the drug, Forestier recommends that a course of allochrysine shall begin with three injections of 0·05 g. at intervals of five days; if these are followed by no reaction, further injections of 0·1 g. should be continued weekly until a total of 1·5 or 2·0 g., according to the patient's tolerance of the drug, has been given. Such a course takes about three months; not more than 2·0 g. should be given in all and the daily dose should never exceed 0·2 g. After the first course the patient should have a rest of 6–8 weeks, and then a second course should begin. When a result has been obtained it is usual to continue the treatment by series of 10–20 weekly injections of 0·1 or 0·05 g. for one or two years. There are variations of this method; some, for example, shorten the treatment by giving only two preliminary injections of 0·05 g. and allowing only six-day intervals in the subsequent injections. The treatment must always be regulated according to the patient's reaction to the drug; with some patients there is little or no reaction, whereas others have a rise of temperature and an increase in their pains. For the giving of sanocrysin Dr. Secher advises an initial dose of 0·25 or 0·35 g., and in certain cases 0·5 g., according to the character of the disease; the more recent and the more violent the symptoms the smaller should be the dose. According to the response to the first injection the second dose is either the same strength or is increased, but he considers it unnecessary to go beyond 0·65–0·75 g., this last quantity being repeated according to the result obtained. The interval between the doses is as follows: second dose on sixth day, third on twelfth day, fourth on nineteenth day, and so on. He gauges the patient's condition by the sedimentation rate, the temperature, and also the reaction to Pirquet's test.

It seems necessary during this form of treatment to keep the patient under close observation; he or she should preferably be in bed, and a continuous temperature chart should be kept. It is not impossible to give the injections while the patient is up and about, but he or she should be confined to the house and should certainly remain in bed during the first part of the course. There are a few contra-indications to the giving of gold; renal function should be satisfactory and the blood pressure not too high; any obvious inefficiency of the liver also makes it an undesirable form of treatment. There are also certain toxic symptoms—they can hardly be called complications—which may develop during treatment, and it is important to be familiar with them. First, albuminuria may appear; this is always slight and does not last more than two to four days. Secondly, skin eruptions; these are mostly morbilliform rashes, although several cases of erythrodermia with subsequent desquamation have also been observed. A mild form of stomatitis with erosion of the lips and tongue may develop; this is very rarely severe, but it is as well to wait and postpone the next injection when any of these toxic symptoms are noted. Several cases of conjunctivitis have been described, and in one case keratitis developed during the course of treatment; and it is interesting to note in this connexion that experimentally sanocrysin injections given to tuberculous animals have produced with one dose only a phlyctenular conjunctivitis. There seems no doubt, however, that we have here a form of treatment which gives definite and lasting benefit, and it is unfortunate that its expense is often prohibitive. There is general agreement that the injections should not be relied on alone, but should be combined with physiotherapy.

[1] THE LANCET, 1932, i., 441.
[2] Traitement des Maladies Rhumatismales par la Sanocrysine. Copenhagen: Levin and Munksgaard. Paris: J. B. Baillière et Fils. 1933. Pp. 23.

JAKE PARALYSIS

THE path of the alcoholic in search of euphoria is beset with thorns. His cider may contain lead, his beer either lead or arsenic, and his "Jake" tri-ortho-cresyl phosphate. Various adulterated but fairly harmless ginger drinks, known colloquially as Jake, have been sold for many years in the United States under the label Fluid-extract of Ginger U.S.P. Jake is a thin, dark-brownish liquid with an aromatic odour and a pungent taste. It was extensively used by the laity not only as a panacea for abdominal pain but also as an intoxicant. It consisted mainly of alcohol with some castor oil and a small quantity of oleoresin of ginger as a flavouring agent. Dr. J. G. Kidd and Dr. O. R. Langworthy,[1] of Johns Hopkins Hospital, have lately summarised what is known of the polyneuritis—clinically distinct from other polyneuritides, but similar to Landry's ascending paralysis though less acute—occurring in drinkers of this beverage. The disease is variously known as Jake paralysis, Jake neuritis, Jamaica ginger polyneuritis, ginger paralysis, and tri-o-cresyl phosphate poisoning. It is interesting to note that whereas Jake has been on the market since 1863 no cases of Jake paralysis were observed till 1930,[2] in which year tri-o-cresyl phosphate and resin oil were first introduced into the manufacture of Jake as a cheap substitute for the true oleoresin of ginger. By the end of the summer nearly 5000 cases of the disease were recorded and the total number in the whole of

[1] Bull. Johns Hopkins Hosp., January, 1933, p. 39.
[2] See THE LANCET, 1930, ii., 152, 601.

the United States was estimated at about 20,000. The outbreaks occurred almost simultaneously in widely scattered communities. Almost all the Southern States were affected and so were Massachusetts and Southern California. Prohibition, so often the nigger in the woodpile, cannot be held in any way directly responsible, since the consumption of Jake had been going on for more tham 50 years before its advent.

The disease usually starts with a preparalytic stage which may last a month, after which a flaccid paralysis of the lower extremities rapidly develops. In most cases the upper limbs also become involved about a week later. Fatal cases have been reported but are rare. Most cases respond to treatment on general lines and improvement, though gradual, occurs in time. The paralysis tends to disappear in the reverse order to that in which it first shows itself, the upper limbs recovering before the lower. The disease has been experimentally produced in cats by the injection of varying doses of tri-o-cresyl phosphate and the effect of the drug is found to be cumulative. Post mortem, lesions of the ventral roots of the spinal cord and of the somatic motor cells of the anterior horns have been demonstrated in these animals.

Baker in 1768 proved that the presence of lead acetate in cider was the cause of Devonshire colic. Reynolds, in 1900, showed that an epidemic of polyneuritis among beer-drinkers in Manchester was due to contamination with arsenic. The occurrence of Jake paralysis, as late as 1930, emphasises once more that poisonous substances may still be accidentally or deliberately introduced into food and drink by manufacturers who are actuated by no worse motive than a natural anxiety to decrease the cost of production. Being, par excellence, a preventable disease, it is to be hoped that Jake paralysis will have a short life. It is easy to be wise after the event, but 20,000 casualties seems to be a heavy price to pay for the knowledge that the disease is preventable.

HOSPITAL ALMONERS

In spite of financial depression, the number of hospitals starting an almoners' department is increasing from year to year. The movement grows in spite of (or is it because of ?) present-day difficulties, which emphasise the need for wise spending of the funds available for social service. At the close of the year 1932 there were 107 students in training for the certificate of the Institute of Hospital Almoners, and for the first time in the history of the Institute the supply of trained almoners has exceeded the demand. This, it may be presumed, is a temporary happening, due to the fact that hospital social service for women has recently received a good deal of notice. Students are getting a background of social study in London at the School of Economics (33) and at Bedford College (7), at the universities of Glasgow (1), Leeds (4), and Liverpool (1), and at Armstrong College, Newcastle-upon-Tyne (4), while 56 are doing the practical side of their training in hospital or under the Charity Organisation Society. Hospitals show an increasing tendency to appoint almoners trained by the Institute. The report just issued gives the numbers at the end of 1932 as 37 hospitals in London, 45 in Scotland, Ireland, and the provinces, and 4 abroad (Melbourne, Hobart, Paris, and Stockholm). In addition, 77 certificated assistant almoners trained by the Institute are at work in various hospitals. This is a fine tribute to the pioneer work of the small group of women who began the almoners' movement at St. George's, St. Thomas's, and the Royal Free Hospitals more than 20 years ago. During the year the Institute also financed an investigation into the social factors relating to chronic rheumatism and published a short history of the movement as it concerns the growth of social service work for British hospitals.

THE ANÆMIA OF NEPHRITIS

Little more is known to-day of the cause of the anæmia associated with renal disease than was known in 1836 when Richard Bright noted that in chronic nephritis "the healthy colour of the countenance fades." There is apparently no increase in the plasma volume, so that the anæmia is not due to dilution. The amount of blood lost in the urine is probably too small to account for the anæmia. Parsons and Ekola-Strolberg,[1] who have recently made a study of anæmia associated with nitrogen retention, believe that defective blood formation is the underlying factor. They are unable to suggest any specific cause for this disordered hæmopoiesis. From a study of their own cases and those already reported they conclude that anæmia is almost always found in azotæmia regardless of the pathological basis for the renal insufficiency. They agree with van Slyke that low hæmoglobin values are of definite prognostic value. Most writers refer to the anæmia of chronic nephritis as "secondary," but reference to the tables given by Parsons and Ekola-Strolberg suggests that it is not markedly hypochromic. Often the colour-index is above 1·0 and figures below 0·9 appear to be the exception. The red cells in their cases were normal in appearance. The average white cell count was 13,800 per c.mm. which is above the average normal, while the Arneth count was shifted to the left. Both these findings may, however, as the authors suggest, be due to terminal infections. The blood platelets are sometimes reduced, which possibly accounts for the hæmorrhagic tendency in certain cases. It is clear that the relationship of anæmia to all types of renal damage raises many interesting problems.

THE INHERITANCE OF DIGESTIVE DISEASES

According to F. A. E. Crew,[2] over 500 disorders or derangements in mankind have been recorded as showing evidence of being related to hereditary factors. The evidence, as he points out, mainly consists of the appearance of the disease in a more or less orderly fashion among related persons. The mode of inheritance, and sometimes even the actual fact of inheritance, is difficult of proof in the inevitable absence of controlled breeding experiments, whilst constantly the problem of isolating genetic from environmental factors is not fully appreciated or fully capable of solution. Such difficulties are apparent in the literature relating to the inheritance of digestive diseases as reviewed by Dr. Paul Carnot.[3] For instance, he quotes from Warthen an instance of a "cancerous" family. In this case a man whose father had died of cancer of the stomach died himself of cancer in the same site. His wife died of cancer of the breast, and his six children and one grandchild all died of various forms of cancer. This, as Carnot points out, is an impressive family history; but is it necessarily evidence of an inherited factor? The probability to-day of death being due to cancer is unfortunately not small; the field of observation amongst medical men is enormous; what is the probability that such isolated instances will from

[1] Parsons, L., and Ekola-Strolberg, M.: Amer. Jour. Med. Sci., 1933, clxxxv., 181.
[2] Milroy Lectures, Edin. Med. Jour., 1928, xxxv., 301, 383.
[3] Paris Méd., April 1st, p. 288.

time to time turn up merely by chance? It certainly cannot be negligible, and only the repeated observation of such instances can therefore be at all convincing. Actually, we too often have only one part of the field reported; while notice is taken of these striking cases usually no reference is made to the vast number of isolated cases in which no inheritance is apparent. With the present rate of fatality upon the roads it is not impossible that a series of deaths from motor-car accidents recorded and in pedigree form would look impressive; but in collaterals one would hesitate before explaining it on the basis of an inherited accident diathesis. The same argument applies to Carnot's citations of the familial incidence of appendicitis. For instance, he quotes Schaumann as reporting a family in which five sisters had appendicitis, while he lays stress on the belief of various authorities in a family association between adenoids and appendicitis. In such cases of relatively common disabilities, family pedigrees showing a high incidence are suggestive rather than convincing. Despite the mass of information summarised by Carnot in his interesting review, it must be admitted that at present our knowledge of inherited disorders in general is still very limited and our views often biased by a few outstanding examples. Information on a very much larger and more truly representative scale is required and, it is to be hoped, will eventually be forthcoming from the investigations that are being planned by the Medical Research Council's committee on human genetics. Meanwhile the letter from Prof. Ruggles Gates, on p. 881, gives a useful lead to medical men who wish to play their part in the accumulation of reliable data.

THE NASAL FACTOR IN ASTHMA

SOME recent discussions on asthma and vasomotor affections of the nose show a considerable change of opinion on the relationship between these affections. We are no longer content to regard vasomotor rhinitis as a reflex neurosis, nor asthma as a reflex spasm initiated, at least in some cases, by intranasal irritation. Advances in knowledge of anaphylaxis and allergy, of biochemistry and endocrine balance, now make it possible to take a wider view of these disturbances, and the discussion at the laryngological section of the Royal Society of Medicine in December last [1] revealed a general consensus of opinion that nasal abnormalities are not to be considered as a cause of asthma, but rather that vasomotor rhinorrhœa and asthma are both due to the same cause, or are both manifestations of the same disturbance. Sir James Dundas-Grant stated the problem by saying that if the allergic element was looked upon as the explosive factor, the nasal condition should be regarded as the detonator; but if one could not get rid of the explosive, one should remove the detonator, and he considered that the value of nasal treatment should be recognised. Mr. Walter Howarth said he had been disappointed with the permanent results of intranasal operations, but believed that cauterisation was valuable; it had given definite improvement in 10 per cent. of his cases with complete cure in a few. Prof. Storm van Leeuwen, whose paper opened the discussion, did not mention cauterisation, but had not been favourably impressed by the results of operation; he agreed, however, that he was less likely to see the successful than the unsuccessful results. In a similar discussion at the Manchester Medical Society, held in February, Mr. Holt Diggle said that he had found intranasal cauterisation of considerable value, especially in primary allergic asthma, and when the nasal passages were apparently normal. He also advocated the correction of all sources of nasal irritation, such as deflected septa and enlarged middle turbinals, and claimed with all forms of nasal treatment nearly 29 per cent. of absolute cures and 38 per cent. of great improvement. At the present time a reasonable attitude appears to be that intranasal operations should be performed only if they are indicated on general grounds; thus, a suppurating antrum should be drained, or a septum which causes real obstruction resected; and in such cases the asthma may be improved and sometimes even cured. When the nasal passages appear normal, cauterisation may be tried, for it is harmless when skilfully done, and it is impossible to forecast the cases which it will benefit.

[1] Reported in THE LANCET, 1932, ii., 1287, and more fully in Brit. Jour. Laryngol. and Otol., April, 1933.

CAUSES OF BLINDNESS IN DENMARK

REMARKABLE changes observed in Denmark during this century in the relative importance of various causes of blindness would suggest at first sight that profound biological forces had been at work in the suppression of some factors responsible for blindness, and in the promotion of others. A closer scrutiny of the situation suggests that these changes are to a certain extent more apparent than real, and that they represent changes in outlook and diagnosis rather than in the fundamental properties of germs and other causes of blindness. This is the lesson of a paper by Dr. Gordon Norrie in *Hospitalstidende* for Feb. 9th. In medical charge of an institute for the blind in Denmark during the past 30 years, he has seen many changes, some real, others terminological, in the relative frequency of the causes of blindness. His compatriot, Prof. C. E. Bloch, having included xerophthalmia among the vitamin deficiency diseases, attention has been focused on this cause of blindness in Denmark in particular, with the result that now, in Dr. Norrie's opinion, it is the most important cause of blindness early in life. Certain English statistics, he says, have credited gonorrhœal ophthalmia with up to 50 per cent. of all the cases of blindness. The inclusion in the past of many cases of xerophthalmia in the gonorrhœal group is probably responsible in a large degree for this high ratio. Dr. Norrie has revised his statistics in this field, and has found that, among a total of about 800 cases of blindness some 150 must be labelled xerophthalmia. Their numbers varied greatly from year to year. Among the children born in the period 1913–15, there were as many as 29 cases. This was a peak period. Of late there have been only three to five a year. The periodic distribution of true gonorrhœal ophthalmia was of another kind. There were 51 such cases in all, and among the children born in the 15-year period 1892–1906, there were as many as 42 cases. In the following 15-year period there were only six cases, and since 1921 Dr. Norrie has seen only three—a state of affairs for which, he considers, Credé should be given due credit.

Dr. Harry Campbell has retired from the editorship of the *Medical Press and Circular*, after serving that journal well for 15 years. During this period of time little of importance that has happened "at the periphery" has failed to attract his notice, often given with a philosophic detachment both arresting and disarming. Many will miss his weekly contribution to medical thought.

SPECIAL ARTICLES

HUMAN AND BOVINE INFECTIONS IN BONE AND JOINT TUBERCULOSIS

THEIR PROPORTIONAL FREQUENCY IN SOUTH-WEST SCOTLAND

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THE material used in this investigation was obtained from patients suffering from bone and joint tuberculosis under treatment in St. Andrew's Home on the Isle of Cumbrae, in the Firth of Clyde. The patients admitted to this institution are drawn from counties in the middle west and south of Scotland. The inquiry covers a period of three and a half years from January, 1929, to October, 1932, and deals with all the cases of bone and joint tuberculosis admitted to the Home in which accessible abscesses had formed; with two exceptions, cases admitted with open sinuses were not investigated. To Dr. J. H. Paul we wish to express our thanks for his coöperation.

The total number of cases examined was 86, and from 81 of these cultures of tubercle bacilli were obtained. The first 25 of the cases were investigated at Cambridge, and the results were reported in 1932. The remainder were investigated in part at Cambridge and in part at St. Andrew's Home. In this report we give an account of the results of the whole series.

The original material was pus, aspirated from abscesses which had formed in connexion with a tuberculous bone or joint, except in three cases with bone lesions where cerebro-spinal fluid (2 cases) and empyema pus (1 case) were used. Cultures of tubercle bacilli were obtained from the material, either directly or through the guinea-pig. The strains from the 81 cases fell according to their cultural characters into two groups, sharply distinguished one from the other. In one, the larger group, containing the strains from 54 cases, the cultures grew luxuriantly on the differential media and were identical with the eugonic human type of tubercle bacillus. In the other, comprising 30 strains from 27 cases, the cultures were dysgonic and indistinguishable culturally from tubercle bacilli of the bovine type. The dysgonic strains only were tested as to their virulence and were inoculated into 33 rabbits, 5 intravenously, dose 0·01 mg., and 28 subcutaneously, dose 10·0 mg. or less. All the rabbits died in from 27 to 94 days of general progressive tuberculosis, identical with that which follows similar inoculation of bovine tubercle bacilli of bovine origin.

The case records of some of the patients infected with bovine tubercle bacilli are interesting, either for the severity or the duration of the tuberculous process or for other reasons, and are briefly summarised.

ABSTRACTS FROM CLINICAL RECORDS OF 12 BOVINE CASES

1. Boy, aged $2^{5}/_{12}$ years, with tuberculosis of the upper end of the shaft of the tibia. He had been fed on raw cow's milk from birth. His parents and one brother, the only other child, were healthy.

2. Boy, aged 3 years. When about 11 months old he was taken away from home and for the first time was given ordinary cow's milk; previously he had had only Grade A (T.T.). Two months later he had suppurating cervical glands. He was admitted to St. Andrew's Home at the age of $3^{4}/_{12}$ years suffering from tuberculosis of the first and second dorsal vertebræ with prevertebral abscess. Six months later he developed otitis media, which was followed by pneumonic consolidation, and eventually tuberculous empyema. A culture of bovine tubercle bacilli was obtained from the empyema pus. Large quantities of pus were aspirated periodically until within one month of his death, at the age of $4^{10}/_{12}$ years.

3. Girl, aged 5 years, with advanced right hip-joint disease of $2^{9}/_{12}$ years' standing. There was extensive bone destruction of acetabulum and of head of femur. She had had raw cow's milk from birth.

4. Boy, aged $3^{9}/_{12}$ years on admission. When 18 months old he had measles, and afterwards became round-shouldered. When admitted he was found to have tuberculosis of the fourth and fifth dorsal vertebræ and a large prevertebral abscess. He was treated on a spinal board for nearly two years, when he suddenly developed paraplegia. No improvement was noted in the paraplegia until 13 months after onset, when some voluntary movement of the legs was recovered. At $6^{9}/_{12}$ years the abscess began to bulge under the trapezius and was aspirated. From the pus a fully virulent bovine culture was obtained, the interval after the probable onset of the spinal lesion being over five years.

5. Woman, aged 52 years, with tuberculous disease of the sternum of seven years' duration. Tuberculous cervical glands were removed in 1905. She died of carcinoma.

6. Boy, aged $2\frac{1}{2}$ years, with destructive bone lesion of third and fourth lumbar vertebræ. A brother had been in a sanatorium on two occasions owing to abdominal trouble.

7. Boy, aged $1\frac{1}{2}$ years, with dactylitis. He was bottle-fed in infancy.

8. Boy, aged 11 years, with old-standing Pott's disease of the mid-dorsal region of seven years' duration.

9. Boy, aged 11 years, with destruction of the *spine* of the fourth cervical vertebra. He has since died of meningitis and paraplegia. His brother is also a patient in the Home with chronic osteomyelitis of the femur, the cause of which has not yet been ascertained since no abscess has formed.

10. Boy, aged 7 years, with tuberculosis of a sacro-iliac joint. He was breast-fed for one year. After immobilisation in the Home for $2^{10}/_{12}$ years the abscess still requires periodic aspiration; the total duration of abscess is over three years. Bovine tubercle bacilli were obtained in culture directly from the pus on two occasions, once at St. Andrew's Home in June, 1930, and once at Cambridge in October, 1932.

11. Girl, aged 24 years, with Pott's disease of lower dorsal region of eight years' duration. Lumbar abscess has again appeared after being dry for over one year.

12. Boy, aged 11 years, with tuberculosis of the spine. He was fed from birth on raw milk. Two sisters died of meningitis, the nature of which was not ascertained.

Four of the total number (27) of cases infected with bovine bacilli have died of tuberculosis—two from tuberculous meningitis, one from tuberculous empyema, and one from amyloid degeneration—giving 14·8 per cent. deaths. Of the total number of

cases (54) infected with human bacilli 13 have died of tuberculosis, giving 24·1 per cent. deaths. Attention may be called to the fact that none of the strains of bovine bacilli showed any deviation from the standard, either in cultural characters or in virulence, although in several of the cases the tuberculous process had lasted five, seven, or more years.

STATISTICAL DATA AND REGIONAL DISTRIBUTION

In the following Table the proportional frequency of the human and bovine types of tubercle bacilli at various age-periods is shown.

Age-periods.	Cases.	Human.	Bovine.	Per cent. bovine.	
0– 4 years	18	6	12	66·6	56·8
5– 9 „	19	10	9	47·4	
10–14 „	16	13	3	18·7	
15 and over	28	25	3	10·7	
	81	54	27	33·3	

The figures show that two-thirds of the children under 5 and more than half of those under 10 years of age were infected with bovine tubercle bacilli.

It is interesting to compare the bovine percentages in this series of cases with those reported from other districts in Scotland as follows :—

Authors and district.	Up to 14 years.		All ages.	
	Cases.	Per cent. bovine.	Cases.	Per cent. bovine.
Fraser (Edinburgh) ..	67	65·7*	70	62·9*
Griffith (mainly ditto) ..	28	28·6	30	26·6
Munro (Middle East) ..	23	30·4	50	26·0
Blacklock (Glasgow) ..	20	40·0	—	—
Griffith and Summers (South West)	52	45·3	81	33·3

* Including three cases in which human bacilli were also said to be present.

The majority of our cases—namely, 75—belonged to the counties of Ayrshire, Dunbartonshire, and Renfrewshire. The remainder came from Lanarkshire (three, all bovine, one infected in Buteshire), Argyllshire (one human), and Stirlingshire (one bovine and one human). Ayrshire contributed 37 cases, of which 13, or 35·1 per cent., were bovine; 23 of the cases were in children under 15, and of these 12, or 52·2 per cent., were bovine. From Dunbartonshire there were 17 cases, including 9 from Clydebank. For children under 15 the percentage bovine was 60 for Clydebank and 29 for the rest of the county. Renfrewshire sent 21 cases, of which 11 were from the burgh of Greenock. Of the latter only 1 was infected with bovine tubercle bacilli, while of the remaining 10 which came from villages and small towns in the county 4, or 40 per cent., were bovine.

THE DIFFERENT BONES AND JOINTS INFECTED WITH BOVINE BACILLI

In this series of cases the bones of the vertebral column and the hip-joints were most frequently the seats of tuberculosis. Of the 81 patients, 31 had spinal caries and 25 suffered from hip-joint disease. The percentage of bovine infections in the spinal cases was 25·8, which is practically the same as that for spinal cases in the much larger English series—viz., 25·5. In the hip-joint cases the percentage bovine was 36, or nearly twice that—viz., 19·5—for hip cases in England.

Other bones and joints affected were ribs, sternum pelvis, tibia, knee, ankle, and bones of the foot and hand, but the numbers of each of these were too small for separate percentages. Altogether there were 25 other bones and joints, and of them 10, or 40 per cent., yielded bovine strains. Bovine bacilli were obtained once each from a knee, a sacro-iliac, a metacarpal and a wrist-joint, the sternum, ilium, sacrum, and a phalanx (in the last case a tibia, an ulna, and the metatarsal bones were also affected), and twice from the head of a tibia.

SUMMARY

(1) Tubercle bacilli have been obtained in culture from 81 cases of bone and joint tuberculosis from south-west Scotland.

(2) The strains from 54 of the cases were of the human type, while from the remaining 27 (33·3 per cent.) they were of the bovine type and fully virulent for rabbits.

(3) Of the 81 cases, 37 were in children under 10 years of age, and of these 21, or 56·8 per cent., were caused by bovine bacilli. Of the remaining 44 cases (persons 10 years and over), only 6, or 13·6 per cent., were found to be bovine infections.

MEDICINE AND THE LAW

An Accident at School

ACCIDENTS to schoolboys have led to several actions against schools in the past month. The case which, when first opened to the jury, seemed most likely to result in substantial damages for the plaintiff, arose from acid burning. A boy was sitting reading a book at Felstead one Sunday afternoon when a school-fellow behind him accidentally upset a test-tube full of sulphuric and nitric acid which had been surreptitiously abstracted from the school laboratory with the mischievous idea of manufacturing gun-cotton. The injured boy's head and neck were so badly burned that it was said that he could never wear a stiff collar again, could not put on evening clothes or any sort of uniform, and would always have two streaks on his head where no hair would grow. The boy and his father complained that the school had been negligent in three ways—first, that proper precaution had not been taken to supervise the boys' study of chemistry and to prevent acids from being improperly removed from the laboratory; secondly, that improper treatment was given after the accident; and thirdly, that no doctor was called in to attend the patient for nearly 20 hours. The first allegation was met with the argument that chemistry cannot be taught if all acids are always under lock and key. The culprit who smuggled the acid out of the laboratory did what he knew was forbidden and dangerous; the school could not be liable for such behaviour. The propriety of the treatment was a matter of medical evidence; if the jury thought that the treatment was proper, it would matter less that a doctor was not promptly summoned. When the accident occurred, the victim, in great pain, rushed to the lavatory, where his school-fellow held his head under the tap. He then found his way to the school infirmary; the certificated nurse in charge of it applied olive oil on lint. An hour later the science master visited the patient and suggested a

lotion to neutralise the acid. Out of three different suggestions the nurse chose a dilution of caustic soda. There was a conflict here between the two parties; the plaintiff said the caustic soda was applied undiluted and was likely to do as much harm as the acid itself; the defendants said it was applied in a dilution of 1 to 400, and that this was harmless and proper. Asked why she had not forthwith sent for the doctor, the nurse said the usual school doctor was ill and she felt competent to attend to the case herself. It was not until 3 P.M. next day that the doctor, paying his regular visit to the school, saw the patient. Medical evidence for the plaintiff insisted that prompt treatment of the burns was all-important, and that bicarbonate of soda should have been used to neutralise the acid. For the defence the school doctor said he approved the nurse's treatment; he could have done no more himself if he had been called in at once. Another medical witness said the nurse's treatment conformed with the standard treatment laid down by the highest authority for acid burns. Faced with this evidence the jury found that the school authorities had not been negligent. Mr. Justice Charles agreed, and said he could conceive of no other verdict in the circumstances. Judgment was given for the defendants with costs, but the case should not be relied upon as authority for the proposition that in such emergencies the science master is an adequate substitute for a medical practitioner.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

HEART DISEASE IN THE INSURED POPULATION

Dr. J. L. Brownlie, chief medical officer of the Department of Health for Scotland, has issued, for the information of insurance practitioners, an important preliminary survey of statistical data of heart disease. The material has been furnished by the insurance practitioners themselves, and the results are sufficient, even at this stage, to show that the observations and experience of the general practitioner can furnish a substantial contribution to general medical knowledge.

The classes of heart disease here dealt with are mitral, aortic, mitral with aortic, and chronic myocarditis. The total of cases was 1860: mitral, 1140; aortic, 189; mitral with aortic, 120; chronic myocarditis, 411. In 13·0 per cent. (241 cases) the question dealing with early symptoms was not answered. Hence it is impossible to say what proportion, if any, of these 241 cases represent really symptomless heart lesions. But in 11·0 per cent. of the other cases (205) the heart lesion showed no symptoms. Of the chronic myocarditis cases only a small percentage is without symptoms; in the three forms of valvular lesion the percentage of "no symptoms" is higher—13·7, 12·0, 13·3—being practically the same for mitral, aortic, and mitral with aortic. The inference is that very few persons with chronic myocarditis are without some warning symptoms. About 1 in 8 with a valvular lesion is unaware of its presence. This supports the view that damage to the muscle is of more moment than impairment of the valves.

The more common early symptoms are shortness of breath, pain, palpitation, lassitude, œdema, dizziness, cough, bleeding, headache, and insomnia. The percentages of these as early symptoms correspond to their percentages at the later stages. But the early symptoms do not show sufficient diversity to be of much diagnostic value, which confirms Mackenzie's view "that these sensations produced by exhaustion of the heart muscle, however easily provoked they may be, give no clue to the underlying morbid condition."

The method of assigning ætiology is new. "The method chosen for the present inquiry has admitted defects, but is free" from the criticism that it involves "clinical preconceptions." "The intention is to compare the previous incidence of the conditions under scrutiny in patients suffering from cardiac affections with similar observations from a control series. The ideal control, in this inquiry, derived from a random sample of the whole Scottish insured population, is unobtainable. The practicable alternative is to elucidate the histories of insured patients who are suffering from non-cardiac affections; and steps have been taken to obtain the requisite data from the Department's regional medical staff." But, with present data, it is possible to say that, in non-aortic cases, there is a more common history of all forms of rheumatic and tonsillar conditions; in aortic cases, a preponderance of syphilis and of cases with negative histories. In combined valvular lesions there is a higher incidence of acute and subacute rheumatism and of syphilis, as against mitral alone, while in mitral alone there is higher frequency of other rheumatic conditions and bronchitis compared with chronic myocardial affections. Mitral shows excess of rheumatic and tonsillar conditions, but less of influenza, bronchitis, and syphilis.

A similar rendering is given of aortic and combined valvular cases. There are tables also showing relative incidence among males and females of the whole insured population. But enough has been here given to show that this small and over-condensed document of eight pages is worthy of the most careful study. The findings "although by no means strikingly novel, sufficiently indicate the possibilities of this hitherto almost untapped source of information on the wider, non-specialist problems of medicine."

MATERNITY HOSPITALS

At the annual meeting of the Edinburgh Royal Maternity and Simpson Memorial Hospital satisfaction was expressed that the end of the congestion is now well in view, since the old Watson's school is under demolition, and a few months will see the erection of a larger and more fully-equipped Simpson maternity pavilion. It is to be hoped that the new provision will be worthy of the Edinburgh medical school. Now that the General Medical Council has taken the active step of requiring a longer period of actual intensive training in obstetrics, the schools will have to take the whole position more seriously than hitherto. It has been long felt that the maternity provision in Edinburgh is not worthy of an imperial university school. For the present, one can only wait for improvements; but it is significant that, owing to the greatly increased numbers, the directors have entered into an arrangement with the public health committee of the corporation for emergency accommodation in Craigleith Hospital. This will now be at the disposal of the medical staff. It is, however, obvious that steps should have been taken 20 years ago, when maternity benefit became a reality under the Insurance Acts and when, as every one saw, both in town and county, the hospital demand was rising like a rapid tide. Incidentally, this arrangement with the city institution indicates how the problem of the "voluntary" hospital

will find at least part of its solution in adjustments with the municipality. It is the antenatal section that will find most relief under the new arrangements.

The Glasgow Maternity Hospital also contemplates an extension which is to cost some £6000. Situated in the very heart of Glasgow, this hospital has grown section by section on its peculiar site until it is now very fully equipped, but no one to-day would propose the present site as suitable for a hospital of this order. The chief purpose of the present extension is to provide an adequate radiological and diagnostic department.

PANEL AND CONTRACT PRACTICE

Prescribing in Manchester

WE pointed out in this column not long ago (1932, i., 1274) that the cost of providing an insured person in Manchester with drugs was nearly double that of the average for England, the explanation being either that Mancunians need much physic or that their doctors are inclined to prescribe more medicine as they pay more visits when these are remunerated on an attendance basis. The Manchester insurance committee appointed a subcommittee to look into this matter of prescribing, and the report for 1932 just issued shows that while the number of insured persons has increased from 347,054 to 349,190, the number of prescriptions has decreased from 6·4 to 6·3 per insured person. The average cost of a prescription having remained the same—viz., 8·1*d*.—the total cost per insured person is 4*s*. 3*d*., against the national figure of 2*s*. 9*d*. for 1931 (the national figure for 1932 being not yet available). The extra cost is attributed in the report to the higher average in the number of prescriptions issued in the area. From 1923 to 1927 there was an increase from 4·2 to 7 per insured person; since 1927 there has been a slight decline. Actually there are wide differences in the expenditure on drugs for the treatment of insured persons; in one case oxygen was supplied to the value of £12 17*s*. The National Pharmaceutical Union act on behalf of the chemists in checking the pricing of these prescriptions, but the errors detected only make an addition of 11*d*. per £100 due to them. Of the 2 million or more prescriptions dispensed by chemists only 108 were for substances or articles which are neither drugs nor appliances; 22 being for hypodermic needles, 10 for hypodermic syringes, 10 for eye shades, and 8 for camel-hair brushes. Needles and syringes can only be ordered by prescription on the drug fund when they are required for the treatment of diabetes. In 1932 there were 537 more prescriptions for insulin than in 1931, at an additional cost of £161; there were 73 more prescriptions of vaccines, but the cost was £7 less than in the previous year. Of 78 samples of drugs, only 11 went to the pharmaceutical service subcommittee for investigation.

Asthma Powder and Cigarettes

The Ministry of Pensions has asked the Manchester insurance committee whether the cost of asthma powders and cigarettes for the treatment of a pensioner by his panel doctor could be borne on an insurance prescription. The clerk replied quite properly that an insured person is entitled to such drugs as are requisite for his adequate treatment—including powder or cigarettes for the treatment of asthma—but that the character and quantity of the drugs is a matter to be determined by his insurance doctor. This has always been the rule, although it may be the first time it has been brought to notice through the action of a Government department. What usually happens is that an insured person goes on his own account to someone described as a consultant, who examines him and gives him a prescription. The consultant may or may not write to the insurance doctor, but the patient comes to him and says: "I want you to order this for me on the panel." Of course the insurance doctor is under no obligation whatever to do so, although he might be wise to have a little caution, as in the event of a complaint being made he would have to prove that he did prescribe what he himself thought was adequate treatment, and that he had some good ground for refusing to order the prescription submitted.

Out of Benefit

The reply of the Ministry of Health on April 4th to a question by Sir Robert Aske seems to make it certain that no change will be made in the arrangements for the medical treatment of the unemployed insured persons who go out of benefit at the end of this year. A conference of the North-Eastern insurance committees has passed a resolution similar to that passed by the Barrow and Birmingham insurance committees expressing the opinion that provision should be made for the continuation of existing medical benefit to those insured persons whose right to sick benefit would terminate on or after the end of this present year owing to prolonged unemployment.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

Surg. Lt.-Comdr. E. T. S. Rudd to *President*, for course.

Surg. Lt.-Comdrs. (D.) M. F. Hopson to *Vernon*; D. C. Eglinton to *Egmont*, for Malta Hosp.; and S. E. Brown to *Pembroke*, for Chatham Hosp.

Surg. Lts. S. Jenkinson to *Alecto*; W. Greaves to *Hermes*; and S. K. Foster to *Scarab*.

Surg. Lt. C. J. Mullen to *Ark Royal* and to *Laburnum*.

ROYAL NAVAL VOLUNTEER RESERVE

Surg. Lt.-Comdr. (D.) W. H. Hume to *Victory*, for R.N.B.

Surg. Lt.-Comdr. R. J. Matthews to *Iron Duke*.

ROYAL AIR FORCE

The undermentioned are granted short service commission as Flying Officers for three years on the active list: William Hall and John McGovern.

INDIAN MEDICAL SERVICE

Capt. (on prob.) W. Aitchison to be Maj. (prov.) (on prob.).

Lt. A. W. West to be Capt. (prov.).

The undermentioned appt. is made: W. Aitchison to be Capt. (on prob.).

The undermentioned appts. have been made in India:—A.D's.M.S.: Col. A. W. M. Harvey, Col. W. H. Leonard, K.H.P., Col. J. A. Turnbull, D.S.O.; Lt.-Col. W. T. McCowan.

NEW HOSPITAL BUILDINGS.—The Building Industries' National Council has collected from hospitals throughout the country particulars of their current building enterprises which show that work to the extent of £400,000 is in progress, about to start, or just finished. The largest scheme is that of Grimsby Hospital (£80,000); the Royal Hospital, Worcester, follows with £63,000; the new nurses' home at the Royal Hospital, Leicester, is costing £55,000; and the extension of Gloucester Hospital £40,000. The cost of King's College Hospital medical school, now almost finished, is also £40,000.

THE DOCTOR'S DAY

"Come, tell me how you live," I cried,
"And what it is you do!"

XXIV.—PATHOLOGIST TO A PROVINCIAL HOSPITAL

PATHOLOGY is the foundation of medicine. This is not a pious opinion, but a statement of fact. No hospital can hope to keep its work abreast of the times unless it maintains its own pathological department. I am the pathologist attached to a hospital of some 250 to 300 beds, serving a district of about half a million people.

A FREE HALF-HOUR

The work of the laboratory starts at 9 A.M., but it is not necessary for me to be there at that time; the first half-hour of the day will be spent in preparing for the day's work. The cultures left overnight in the incubator must be sorted out, slides prepared for microscopical examination, subcultures put up, histological material carried on a further step, and so forth. All this can be done by the technical staff in the absence of its head. Between breakfast and 9.30 my time is my own, and this is a convenient time for visits to nursing-homes; it is however not often that such visits are called for. To-day there is a diabetic entrusted to me by his practitioner for control of diet and regulation of insulin dosage. On admission his urine was full of acetone and sugar; under treatment the sugar rapidly diminished, but the acetonuria has persisted until to-day, when both sugar and acetone are absent. A specimen of blood is taken for sugar estimation; this will be examined at the laboratory and instructions telephoned later.

As I am leaving the home I am met by a surgical colleague who had operated two days before on a young woman for mastoid suppuration. She has run a temperature ever since, and yesterday she developed a severe headache. The patient is flushed and rather stuporous; meningitis is in question. I always carry a dry sterilised lumbar puncture needle in a plugged test-tube in my bag. The surgeon, who is all the better surgeon for having graduated from general practice, gives a whiff of anæsthetic. The fluid is under pressure but clear, and everybody breathes a sigh of qualified relief. I pocket a specimen to take back with me.

MORNING ROUTINE

I reach the laboratory a minute or two late. The specimens are handed over to the senior technical assistant, who starts the routine appropriate to each. The mail bag produces little in the way of material for examination. In this district it is the custom of practitioners to call the pathologist to the patient to collect what specimens he thinks desirable, rather than to send the samples to the pathologist. This morning there is a sputum from a case of chronic bronchitis, with a request for the preparation of a vaccine. The hospital cultures put up yesterday present no special difficulties; staphylococci, streptococci, and pneumococci turn up as every day, and are duly reported. A few days ago there was an outbreak of diarrhœa in the children's wards; yesterday organisms were isolated from three stools which gave the sugar reactions of one of the dysentery group. They were put up in pure culture yesterday, and to-day the emulsions are washed off and put up against the specific sera. Two of the strains prove to be *B. dysenteriæ* Flexner, and word is sent to the ward in order that the usual steps for isolation may be taken. A blood culture taken on the previous day from a case of obscure pyrexia shows a coliform bacillus; a rough agglutination indicates that it belongs to the aertrycke group. The organism is put up in the sugars as a preliminary to a more complete investigation, and in the meantime a warning is sent to the wards to put the patient on "precautions."

A surgical colleague looks in to talk about a case he operated on 12 months ago for carcinoma of the stomach. A simple gastro-jejunostomy had been performed and a lymph node removed for section. The laboratory had reported this as invaded by growth. The surgeon tells me that the patient had come to his out-patient room this morning, apparently in good health. He queries the diagnosis. Reference to the serial number of the original report makes it easy to lay hands on the sections; after examining them the surgeon agrees that there is no doubt about malignancy and adjusts his view of the prognosis. Requests have been received from the wards for the performance of two blood counts. These specimens must be taken by myself. Both are patients who have been febrile since admission a week ago, and are dull and lethargic. No definite diagnosis has yet been made. Examination in the laboratory shows in the one instance a leucopenia; in the other a moderate leucocytosis. I suggest to the house physician a Widal test in the first case, and examination of the cerebro-spinal fluid in the second. The latter I suspect will prove to be tuberculous meningitis.

AUTOPSIES AND RESEARCH

At noon there are two post-mortems to be performed. One is on a woman who died eight days after hysterectomy while she appeared to be going on well—query pulmonary embolism. The gynæcologist who performed the operation attends with his house surgeon; both are anxious to see if there has been any failure in surgical technique. The autopsy reveals a perfectly clean operation site. On cutting into the pulmonary artery a coiled embolus is evident; it looks as though it might have come from a large vein, but exploration at the site of the operation reveals no thrombosis. The other is on a woman whom I had myself examined in the wards some days before. She had been febrile since admission a month ago, and a rough mitral systolic bruit was to be heard; a non-hæmolytic streptococcus had grown from a specimen of blood. A confident diagnosis of infective endocarditis had been made, and the autopsy confirms this. Both mitral and aortic valves show large ulcerating vegetations; the latter had not been suspected during life.

There is time for a few minutes in the laboratory again before lunch; the bulk of the day's specimens have now arrived from the wards. These comprise blood for the estimation of urea and sugar, pus and serous fluids, urine, sputum, and so forth. I give instructions about their disposal and return home for lunch. When I get back to the laboratory the routine work is well in hand, and I have an hour for matters of more particular interest. To-day it is the investigation of a case of plumbism. Samples of blood and of urine from several days past are at various stages of examination. I am endeavouring to correlate variations in serum calcium and urinary lead content before and after treatment with parathormone. I hardly hope to discover anything new to anyone but myself; the investigation makes me think about the subject, and that is all to the good.

Systematised research is not easy in a post of this sort. There are born investigators who will do good work wherever they find themselves, but they are few. Removed from the stimulus of contact with those whose life is ordered for research, the majority of test workers, no matter how anxious they may be to maintain the traditions of their training, find it hard to break fresh ground. New ideas rarely come to the solitary worker, and provincial laboratories are not often fitted for advanced research work. On the whole it may be best for the hospital pathologist to keep his feet planted firmly on established fact; he can still do valuable work in rendering the ground beneath them even more solid. There are always cases in the wards requiring investigation; sometimes this leads to unexpected and interesting results.

REPORTS AND HOME VISITS

At the end of the laboratory day there are the hospital reports to be signed and the correspondence arising from the day's work to be dealt with. The cerebro-spinal fluid collected in the morning shows no pus cells, no increase of protein, and—what is of even greater importance—no decrease of chlorides. A letter to the surgeon which will allay his fear of meningitis will be dropped at his door on the way home; this is one advantage of living in a small community. The sputum received by post with request for a vaccine has revealed tubercle bacilli, and the sender is told of this; perhaps he may now not want a vaccine.

On the way home a further call is paid on the diabetic patient seen earlier in the day. The diet is drafted for the ensuing day, and a further sample of blood taken for examination to-morrow. At the house are two patients for whom appointments have been made by their doctors. One is a young woman suffering from recurrent boils; she is sent up with the request for the preparation of a vaccine. Questioning discloses a diet in which sweets and pastries bulk largely to the exclusion of fresh fruit. Even in a case of this sort it is advisable to make a brief physical examination; this reveals nothing abnormal. Swabs are taken from the current boil. These will keep until to-morrow; staphylococci are hardy. The patient is dismissed with a caution to limit the intake of sweetmeats and to eat more fruit. The second patient is a man of 40, who has lost 2 st. in weight in the past two months. His doctor has found sugar in the urine and diagnosed diabetes. The man is thin, though not unduly so; the scales show him to be 30 lb. below his standard weight. He has a nervous and worried air; his hands are tremulous, and his eyes a little protuberant. The specimen of urine shows a little sugar, but not as much as would be present were the symptoms due to diabetes; acetone is absent. Physical examination shows a rapid and dilated heart; the blood pressure is high. A specimen of blood is taken for sugar estimation, but one has formed a shrewd idea that the basis of the trouble is hyperthyroidism and not simple diabetes. It will be suggested to the doctor that this patient be admitted to a nursing-home for observation, including estimation of the basal metabolic rate.

After dinner the journals. Nothing will be felt more keenly by the pathologist coming from London or from a university centre to practise in a provincial town than the absence of a medical consulting library. There are at least four journals to which he must have constant access; to these he must subscribe himself. But there are countless other journals to which he will wish to refer from time to time, and for these he must depend upon some circulating library. It is almost essential for him to belong to the Royal Society of Medicine; access to the splendid library in Wimpole-street and the opportunity of attending meetings of the pathological section will help to mitigate the isolation in which he works; but unfortunately the degree to which he can be assisted by a medical institution will vary inversely with its distance.

NOT EVERY MAN'S JOB

It is this isolation which is the principal, perhaps the only, drawback to the life of the pathologist attached to a provincial non-teaching hospital. Apart from this it offers many attractions. The work never fails in interest, and granted a progressive hospital board, colleagues of an inquiring turn of mind, and a district in which all the routine pathological work is not being done by the local authority at the cost of the rates, it may not be unremunerative. The terms on which the hospital pathologist works depend upon the size and importance of the hospital and the attitude of his governing body. He should of course rank as a member of the honorary staff, on the same footing as his medical and surgical colleagues. Failure to offer such status indicates lack of appreciation of the importance of his department, and the would-be pathologist should be chary of attaching himself to a hospital with this outlook.

But in any case the work of the pathologist is not so lucrative as that of his clinical colleagues. Many governing bodies recognise this and subsidise a competent pathologist in order to induce him to join the staff. The amount of the salary offered varies; in some cases it will be eked out by a percentage on fees for work for private practitioners, and for other institutions and public bodies, performed in the department. Almost every hospital has its own arrangements in this respect, but the larger provincial hospitals mostly guarantee the pathologist an income not less than that earned by a reasonably successful panel practitioner. The career of hospital pathologist is one of the newest open to medical men and women. It is a career in which, unlike almost every other department of medicine, openings continue to occur. But it is not every man's job; it demands experience in and an aptitude for both clinical and laboratory medicine, and the bent towards both is not often combined in the same individual. Little has been done by the teaching schools to train clinical pathologists; the University of London has lately given a lead by the establishment of a diploma in clinical pathology. In future it will repay any medical man or woman contemplating the career of hospital pathologist to acquire this distinction.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 8TH, 1933

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 31 (last week 18); scarlet fever, 2098; diphtheria, 776; enteric fever, 28; acute pneumonia (primary or influenzal), 1230; puerperal fever, 34; puerperal pyrexia, 117; cerebro-spinal fever, 54; acute poliomyelitis, 5; encephalitis lethargica, 8; dysentery, 16; ophthalmia neonatorum, 69. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 11th–12th was as follows: Small-pox, 61 under treatment, 2 under observation (last week 44 and 5 respectively); scarlet fever, 1671; diphtheria, 1622; enteric fever, 11; measles, 334; whooping-cough, 634; puerperal fever, 27 (plus 15 babies); encephalitis lethargica, 233; poliomyelitis, 2; "other diseases," 371. At St. Margaret's Hospital there were 16 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox, 2 (1) from enteric fever, 48 (1) from measles, 11 (3) from scarlet fever, 20 (3) from whooping-cough, 21 (8) from diphtheria, 46 (12) from diarrhœa and enteritis under two years, and 77 (9) from influenza. The figures in parentheses are those for London itself.

Plymouth reported the only death from enteric fever outside London. Birmingham reported 5 deaths from influenza, Manchester and Rhondda each 4. Six deaths from measles occurred at Liverpool and at Nottingham, 5 at Birkenhead, 4 at Sunderland, each 3 at Wigan, Bristol, and West Bromwich. St. Helens reported 3 deaths from whooping-cough.

The number of stillbirths notified during the week was 304 (corresponding to a rate of 45 per 1000 total births), including 47 in London.

THE COST OF MOTOR ACCIDENTS.—Last year the Norfolk and Norwich Hospital treated 162 in-patient victims of motor accidents at a cost of £1613, of which £330 was recovered from the insurance companies. In 1931 the number was 134, the cost £1552, and the amount recovered £48.—At Ulverston Cottage Hospital last year 31 road accident patients stayed a total of 846 days, and cost £295, of which £37 was recovered; the patients paid £30.—The Royal Victoria Hospital, Belfast, treated 165 similar cases (average stay 26 days) at a cost of £1793; the amount recovered was £863.

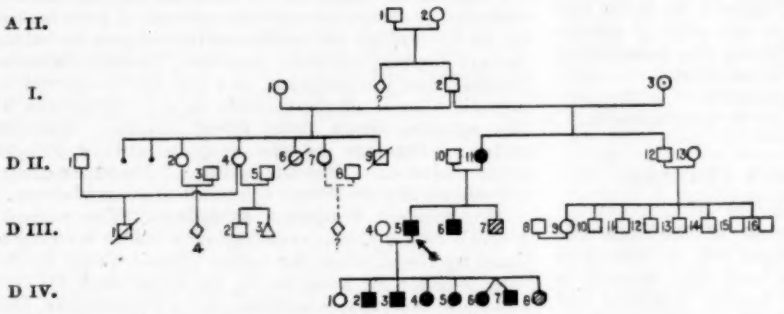
CORRESPONDENCE

THE SYMBOLS USED IN PEDIGREES

To the Editor of THE LANCET

SIR,—One still finds much variety in the symbols used in the construction of pedigrees appearing in various medical journals, and many of those published leave a great deal to be desired. A few years ago the Eugenics Society took up the matter, and finally drew up a rather complete scheme of symbols. In this system squares and circles were considered preferable to the signs (♂ and ♀) still frequently used for male and female. They are much clearer when one has to examine large numbers of pedigree charts. The older symbols, especially when printed on a small scale, but also when crowded, are difficult to read and not infrequently a source of error.

The scheme of symbols drawn up by the Eugenics Society is reproduced in the accompanying Figure, which represents an actual pedigree of cataract. The letters and figures at the left-hand side represent the successive generations of descendants and ascendants, and each individual in the pedigree can thus receive a number Thus I.3 represents a woman who was normal but a transmitter of cataract. The small solid circles in D II represent miscarriages or stillbirths. The symbols with an oblique line through them, as D II.6, D II.9, and D III.1, represent deaths in infancy (under seven years). A triangle represents one individual, and a diamond several of unknown sex, as in D III, the number beside the diamond indicating the number of children. A broken line connecting two individuals represents an illegitimate union, the continuous line representing a marriage. The propositus is marked by an arrow. Symbols cross-hatched, as D III.7 and D IV.8, represent



doubtful individuals, of whom it is either unknown whether they had the defect, or, in the case of a disease like cataract, they may have died young, before the condition had time to manifest itself. Twins are represented by D IV.6 and 7.

These symbols cover all that are required for most pedigrees. Additional ones can always be adopted for special cases or where the inheritance of several conditions is being followed in the same pedigree, and the following letters, placed by the pedigree symbol, have been adopted by the International Federation of Eugenic Organisations as standard for certain traits :—

A = alcoholic.	N = normal in reference to traits under consideration.
B = blind.	Ne = neurotic.
D = deaf.	P = paralytic.
E = epileptic.	Sx = sexually immoral.
F = feeble-minded.	S = syphilitic.
I = insane.	T = tuberculous.
M = migrainous.	

A booklet on "How to Prepare a Family Pedigree," giving a full explanation of the symbols, together with a ruled sheet for the pedigree and blank pages for other information, can be obtained from the Eugenics Society for 6*d*. Most of the symbols here used are already well known. This system has been adopted by the International Federation of Eugenic Organisations, and there would be distinct advantages if the editors of medical journals would adopt it. At present it appears that each author chooses his own symbols, sometimes with weird results, or different journals use varying symbols. A uniform method of recording pedigrees has great advantages, even although some of the other symbols may be intrinsically as good as these.

I am, Sir, yours faithfully,

April 12th, 1933. R. RUGGLES GATES.

MONGOLISM IN TWINS

To the Editor of THE LANCET

SIR,—Dr. Russell's note in your last issue (p. 802) on mongolism in twins reminds me to call attention to what is, I believe, a long standing fallacy in medical literature. The two methods of determining the proportion of uniovular to binovular twins—the statistical and the anatomical—give quite different ratios.

The statistical method, based on the assumption that binovular twin births should have a sex distribution of 1 MM–2 MF–1 FF—i.e., equal numbers of twins of same sex and of different sex, and that the excess of twins of the same sex is due to uniovular twins, gives a ratio of binovular to uniovular of less than 4 : 1. Surprisingly enough, this ratio appears to be constant in countries of widely different birth-rates. The anatomical method is differently described in different text-books, and is confused by the fact that many observers write as if the split in the embryo always took place after implantation. The ratio they give varies from 6 : 1 upwards in favour of binovular twins. I suggest that at the moment there is no method of deciding in the majority of twin births whether the twins are uniovular or binovular.

Further, to return to Dr. Russell's note, the fact that in all the cases quoted, where both twins have been mongols, the twins have been of the same sex, is in favour of a germinal defect. Considering the small numbers involved, it is perhaps hardly worth calling attention to the coincidence that the distribution of mongolism in the twins quoted is exactly what one would expect statistically.

I am, Sir, yours faithfully,

Millbank, S.W., April 14th, 1933. D. A. JENNINGS.

To the Editor of THE LANCET

SIR,—Dr. Russell in his interesting note mentions 36 instances of twin-birth in which one child has been mongoloid. In Macklin's series, analysed in my book ("The Mongol in our Midst"), there are 48 such. One point has evaded Dr. Russell's notice. Several instances of bimongoloid and homosexual twin-births have been recorded. In most of them

the birth was uniovular, but some of them may have been binovular. No mono-mongoloid uniovular twin-birth, whether homosexual or heterosexual, and no heterosexual bimongoloid uniovular twin-birth has been established. We should expect as much, *ex hypothesi*.

But while all mono-mongoloid and possibly some bimongoloid twin-births are binovular, and some of the mono-mongoloid binovular births have been heterosexual and others homosexual, the possibly binovular bimongoloid twin-births have all been homosexual. There is *no* recorded case of a bimongoloid heterosexual twin-birth! There are the best of theoretical reasons why a bimongoloid heterosexual uniovular twin-birth should not occur, but I cannot imagine any reasonable explanation of this fact, which I have been the first to point out, that while there are plenty of non-mongoloid heterosexual binovular twins there is no instance, amongst nearly 50 mongoloid twin-births, of one which is at once bimongoloid and heterosexual. I venture to think that the Mendelian explanation, if there be one, of the "facts" of mongolism is herein concealed.

The reference which Dr. Russell gives may lead the unwary to suppose that I have put forward atavism as a or the "cause" of mongolism. Actually, on page 441, after alluding to the sporadic mongolism of the ethnologists, I speak of the "pathological mongolism" of doctors as a blundering, confusional arrest or slowing of development, brought about by conflict in the embryo between parental tendencies, under special circumstances and conditions. It is thus I explain the "summation of physical and mental defects" which Dr. Russell rightly finds "present in varying degree" in different cases.

Finally, may we not all agree to give up speaking of these children as mongols? Supposing that our friends in Mongolia took to speaking of *their* defectives as Nordics, or even as English! Is there any reason why we should not speak and write of *mongoloids*, whenever necessary qualifying the substantive by the adjectival forms, imbecile or idiot?

I am, Sir, yours faithfully,

F. G. CROOKSHANK.

Wimpole-street, W., April 15th, 1933.

DR. D. S. DAVIES AS A PIONEER

To the Editor of THE LANCET

SIR,—Your biographical sketch of the late Dr. D. S. Davies (THE LANCET, April 8th, p. 776) and Dr. J. M. Martin's appreciation both bear witness to his work as a pioneer in public health. I should like to recall an incident that brought him prominently to the notice of the public health service—namely, his early recognition of a milk-borne epidemic of typhoid fever (244 cases) by the help of the then novel Widal reaction. His attention had been drawn to this test by Dr. G. Parker of Bristol, and Dr. Davies, realising the help so definite a guide would be to a health officer, had been practising it for six months and getting more and more confidence in it when in October, 1897, cases of typhoid began suddenly to be notified to him. Other cases were reported and talked of as influenza, so Davies asked all doctors with doubtful cases to take samples of blood. Of 41 samples sent to him, 38 gave a positive Widal, and on the eleventh day the infected milk was prohibited. His account of this outbreak (*Epidemiological Transactions*, 1897–98, p. 78) contains a striking diagram, printed in colours by Bennett Bros. of Bristol, showing the two "pure" milk rounds in blue, the "polluted" round in red, the houses supplied by each, and (in red dots) the typhoid cases that appeared in each house.

I am, Sir, yours faithfully,

Tunbridge Wells, April 9th, 1933. W. E. HOME.

A QUESTION OF NOMENCLATURE

To the Editor of THE LANCET

SIR,—In the first article I wrote (*Brit. Med. Jour.*, 1926, i., 315) on the subject of hemidiaphragmatic paralysis and operations on the phrenic nerve, I avoided the use of "phrenic exairesis," a term used in Germany, by referring to the operation as "phrenic evulsion." The Americans followed suit, but called the operation "phrenic avulsion." Since then the words evulsion and avulsion have been used in this country, both referring to the same operation with the same technique.

Classical scholars, to whom I have applied, tell me that evulsion is the more correct word to describe the operation. As a result of a suggestion that an endeavour should be made to adopt one or other word as the recognised accepted term for the operation, Dr. Jane Walker, president of the Tuberculosis Association, kindly gave me permission to put the matter before the members at the provincial meeting at Cardiff this month. She authorises me to say that the meeting was almost unanimously in favour of "evulsion," two members only voting for the retention of "avulsion."

I hope that from now onwards the word evulsion will always be used when reference is made to the operation.—I am, Sir, yours faithfully,

H. MORRISTON DAVIES.

Ruthin, North Wales, April 11th, 1933.

FRACTURE OF THE SCAPULA DUE TO MUSCULAR ACTION

To the Editor of THE LANCET

SIR,—I have recently had under my care a case of fracture of the spine of the scapula due to indirect violence, or rather to muscular action. I have looked up all the leading authorities on the subject, including Robert Jones, Choyce, Scudder, Lowell, Meurice Sinclair, and Cunningham, and can find no record of a similar case. Robert Jones says: "Fractures of the scapula result from direct injury." Scudder states: "Fracture of the scapula always follows great violence." Sinclair writes: "Fractures of the scapula are almost always the result of great violence."

The accident happened as follows. The patient, a ship's steward, was standing on a ladder washing a beam overhead when the ladder slipped owing to the ship rolling; he hung on to the beam with his left hand and was thus suspended for a few seconds, but he did not fall or receive any direct violence, and he eventually descended the few steps. I diagnosed a fracture of the spine of the left scapula at about the middle third, which was convincingly proved correct by an X ray photograph. Apparently the fracture was caused by the action of the supraspinatus and trapezius, which are attached to the upper border and upper lip of the spine respectively, contracting and pulling upwards when he grasped the beam, while the infraspinatus and deltoid, attached to the lower border and the lower lip of the crest, were exerting counter-contraction and pulling downwards, owing to the slipping of the ladder.

There is no specimen of a fracture of the spine of the scapula alone in the museum of the Royal College of Surgeons of England. I would be glad to know of any other similar recorded case.

I am, Sir, yours faithfully,

D. LE BAS,

Avonmouth, April 18th, 1933. Surgeon, s.s. *Bayano*.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Easter Adjournment

BOTH Houses of Parliament adjourned on Thursday, April 13th, for the Easter recess. They will reassemble on Tuesday, April 25th, on which day the Budget will be introduced in the House of Commons by the Chancellor of the Exchequer.

Legislation Advanced

In the House of Commons on Monday, April 10th, the Housing (Financial Provisions) (Scotland) Bill was considered on Report and read the third time. The Pharmacy and Poisons Bill and the Children and Young Persons Bill (which have already passed through the House of Lords) were read a second time.

In the House of Lords on Thursday, April 13th, the Royal Assent was given to the Children and Young Persons Act, 1933.

Maintenance of Able-bodied Unemployed

PROVISIONS OF NEW SCHEME

In the House of Commons on Wednesday, April 12th, Mr. NEIL MACLEAN, on behalf of the official Labour Opposition, moved:

"That this House regrets that, instead of making the burden of unemployment a national charge, His Majesty's Government have driven large numbers of able-bodied unemployed persons to seek the aid of the poor-law, thereby exhausting the resources of an ever-increasing number of local authorities."

He said that when the present Government took office they did so with the object of solving the unemployment problem, or, if not solving the problem completely, of reducing unemployment to such an extent that the expenditure, not merely of the Government, but of the country as a whole involved in dealing with it, would be lightened. To-day, more than 18 months after the formation of the National Government, unemployment was considerably worse than it was when the Government took office, and the conditions of the unemployed people were also worse. The growing mass of misery in the country, and the financial burden on local authorities involved in trying to alleviate that misery and poverty, had reached such a stage that local authorities were now sending deputations to the Government appealing to them to make unemployment a national charge. A report which he had received in regard to Stockton-on-Tees was an amazing document. It showed that among the number of people who were taken out of an unhealthy slum area and included in what was considered a healthy municipal housing scheme, the death-rate was higher than when they were in the slum area. The medical officer of health for that town gave it as his considered opinion that the high death-rate was due to the fact that the people in the municipal houses, after meeting the expense of rent, had not sufficient money left to spend on food in order to maintain a standard of life to which human beings were entitled. That was one of the most damning indictments that had ever been made against any Government. That was the problem which the Minister of Health would have to meet and inquire into. If it were possible to make definite inquiries in other localities, it would probably be found that a similar condition of affairs existed to that which had been disclosed at Stockton. The whole situation in the country to-day had become so abnormal that the Government must take action.

THE QUESTION OF INSUFFICIENT SUSTENANCE

Sir E. HILTON YOUNG (Minister of Health) said that he did not believe that there was any basis sufficient to support the statement that the unemployed were getting insufficient sustenance. If there was inadequate sustenance in any class of the community it would be shown first of all among the children. If hon. Members would consult the last report of the chief medical officer of the Ministry of Health they would find what they must all feel to be of the greatest comfort. It was stated in that report that there was no evidence that deserved attention of any deterioration of the general physical condition of the children of the country. That was a situation which they might consider with pride. They were all conscious that this entailed effort and struggle on the part of those who were responsible for the welfare of the children. (Cheers.) The accusation of delay on the part of the Government in this matter lay ill in the mouth of the Official Opposition. What was it that had made the task of the Government difficult and long in this regard? It was that, when they came into office, they found the whole system of unemployment insurance in the localities lying in a state of ruin and chaos. The restoration of the stability of the British financial system was not a work that could be accomplished in a short time, or without great effort. The simple and obvious fact, which all hon. Members knew in their hearts and minds, was that there had been a grave increase in the burdens of the country in connexion with poor-law relief, and that was causing grave fresh difficulties to the local authorities owing to the great depression and to the great increase in unemployment.

CHANGE IN DEVELOPMENT OF THE NATIONAL LIFE

They all knew that they were confronted with a difficult problem that needed solution. There were nearly 3,000,000 unemployed, which probably represented a total of nearly double that number who at one time or another in the course of the year had to receive help. The cost of that to the State mounted up to something like £90,000,000 a year. There was no part of our national economic life which did not feel deeply the effects of that strain. New and heavy strains were also being imposed upon the whole machinery of local administration. More important still was the new strain which was thrown in another direction upon the national organisation, and that was that the magnitude of that factor was straining to the extreme the very ideas upon which the system of public help was based. Now they were in a position in which they must regard this problem as on an absolutely different basis. They must get rid of the assumption that anybody who was unable to support himself was necessarily at fault. (Cheers.) They had to accommodate the national and local institutions to that change in the development of the national life. He believed that it would be agreed by all who had given close attention to this question that in the organisation of public help there had been a mischievous feature that had increased in its potentialities for mischief with the increase in the cost of help and the increase in the number of unemployed. That feature was the divorce between responsibility for spending money and responsibility for raising it. (Cheers.) The cost of maintenance of the able-bodied unemployed borne by the Exchequer—the direct cost only—was at present some £80,000,000 a year. The cost that fell on the local authorities through the rates was only some £6,500,000 a year, and of that sum about £1,750,000 was devoted to the maintenance of the sick and infirm, children, and so on. There could not be a better instance of the divorce between responsibility for raising the money and spending it to which he had referred.

JUST DISTRIBUTION OF BURDENS

The second principle that must guide them in their new structure was this: It was no longer

possible to justify to the country as a whole, and in particular to the recipients of help themselves, any unexplained or unreasonable differences in their treatment from place to place; in other words, unnecessary anomalies were no longer tolerable. Bad times were casting a heavy new burden on the whole nation—that was to say, on both the ratepayer and the taxpayer—and what the Government had to do was to see that these two burdens were distributed justly. That could be done by coöperation; it would not be achieved by a mere spirit of reckless competition. In providing finance for the maintenance of the able-bodied unemployed the Exchequer charge during the last few years had enormously increased, while the rate charge for the same purpose had remained practically the same during those years. Before the end of the session the Government intended to take action, and would introduce a Bill dealing on a national basis with the problem of assistance for those who were in need of it, including those who having been insured against unemployment were no longer insured. The essence of the matter was that they had to provide for large numbers of persons who seeking work were unable to find it for themselves, and who, even on the most hopeful calculations, were faced with the disheartening prospect of a continuance of that condition. It would be a primary purpose of the Bill to make a close connexion between the work of giving help in money and the work of promoting the physical and mental welfare of the unemployed, and in particular to protect them, as far as possible, against the ill effects of idleness by training, by occupation, and by recreation.

OUTLINE OF A SCHEME OF CONTROL

As to the important question of administration, it was recognised that the increasing burden of work on the local authorities, the lack of uniformity in local standards, and the fact that by far the greater part of the cost was already borne by the Exchequer—all those circumstances required a greater measure of national supervision and control. The Bill would establish such a measure of control. In particular it would redistribute and define the functions of local authorities and the central Government in relation to assistance from public funds, whether the funds of local authorities or of the Exchequer. One of the bases of this redistribution of responsibility would be that the central Government should accept responsibility, both administrative and financial, for assisting all the able-bodied unemployed who needed assistance. This would necessitate a readjustment of the present block-grant paid to the local authorities by the State, since they would be relieved of a liability to which they had hitherto been subject. At the same time they would take the occasion of these financial readjustments to make some allowance on a regular basis for the special necessities of what were commonly described as the distressed areas. They had to recognise that in this long-term scheme they were constructing a big and a difficult structure. Its promotion, adoption by Parliament, and its construction would all take time. Meanwhile, difficulties did not wait, and this was a difficult year. It was proposed therefore to deal with the immediate question of the difficulties of the distressed areas in this year pending the introduction of the general scheme in the following manner. After discussion with the Chancellor of the Exchequer he proposed to deal with the immediate needs of the distressed areas by carrying to a conclusion as quickly as possible the investigation of the working of the unemployment factor in the block-grant formula. It was almost completed. Secondly, he trusted that the more fortunate areas would be found to be ready, as a purely emergency measure of a temporary character, pending the introduction of the long-range plan, to make some contribution out of their share of the block-grant for the first year of the second fixed grant period—i.e., 1933–34—towards helping the hard-pressed areas. The Government would then propose on their part to bring a greater measure of relief to the distressed areas by providing an additional contribution from the Exchequer equivalent to one-half of the sum which they anticipated might reasonably be provided for those areas by the less heavily burdened local authorities through a suitable modification of the distribution of the block-grant. He was confident that when ten years hence they looked back on the completion of this plan the verdict would be that the National Government had dealt with a national problem in a national manner by the unity of the whole nation. (Cheers.)

SPECIAL REGARD FOR DISTRESSED AREAS

After further debate, Mr. L. THOMPSON moved the following amendment to the motion moved by Mr. N. Maclean:

"That this House resolves that responsibility for assistance to all able-bodied unemployed not over 65 years of age should be accepted by the Government, with such readjustment in financial relations between Exchequer and local authorities as is reasonable, having special regard to the necessities of distressed areas."

Sir R. ASKE seconded the amendment.

Mr. J. P. MORRIS said that during the period of increase of rates for public assistance many local authorities had made attempts not to increase the general rates. The only possible way that they could avoid increasing the general rate was by starving the other services, and that at a time when the demand on those other services had increased. They could not have lower wages, increased unemployment, and decreased insurance benefits, without at the same time increasing the demands upon the health services, the school medical service, and the provision of meals for school-children. Accordingly, the local authorities who had attempted to avoid an increase in the general rate had had the worst of both worlds.

PLEA FOR CONTINUITY IN MEDICAL BENEFIT

Mr. MCKEAG referred to the position of medical benefits to able-bodied unemployed in the distressed areas. He said that for some years provision had been made to continue the insurance benefit of those persons who as a result of the deep depression had been unemployed for years because if was generally felt to be most undesirable that they should be driven out of benefit simply because they were unable to pay their ordinary contributions. The National Health Insurance Act of 1932 provided that all insured persons who on Dec. 31st of this year had been continuously unemployed for two years and nine months would cease to be entitled to medical benefit. They would then be thrown on the poor-law, and would add to the burdens of the very districts which the House was seeking to relieve that day. When such people were thrown on to the poor-law they would be attended by a poor-law medical officer—a medical man who was entirely unacquainted with their medical history. If the man in such a case was unemployed and uninsured at the age of 65 he would lose his right to medical benefit for the rest of his life, except under the poor-law. There were only about 70,000 such cases likely to happen this year, and the annual sum involved was about £40,000. That was a cost which was capable of reduction by arrangement with the medical profession. He wanted the Government to consider this matter. If they were going to make the maintenance of the able-bodied unemployed a national charge, medical benefit should be a national charge also.

Sir E. HILTON YOUNG intimated that the Government were prepared to accept the amendment moved by Mr. Thompson.

On a division Mr. Maclean's motion was rejected by 384 votes to 46. Mr. Thompson's amendment was then agreed to.

HOUSE OF COMMONS

TUESDAY, APRIL 11TH

Safety of Life Convention

Lord APSLEY asked the President of the Board of Trade whether the United States had yet ratified the new Safety of Life Convention, and how many countries had not ratified it.—Mr. RUNCIMAN replied: The answer to the first part of the question is in the negative. As regards the second part of the question, seven signatory countries—Australia, India, Irish Free State, Belgium, Japan, the United States of America, and the Union of Soviet Socialist Republics—have not yet ratified the Convention for the Safety of Life at Sea.

Impure Water-supply at Malton

Mr. HICKS asked the Minister of Health if he was aware that the water supplied by Norton, East Riding, to Malton, had been recently declared by the Malton medical officer to be unfit for human consumption; and what steps were being taken by the local authority concerned to ensure a wholesome and reasonable supply of water to the inhabitants of Malton.—Mr. SHAKESPEARE replied: A single sample of the water supplied by Norton to Malton was found on analysis to be unsatisfactory and the supply was discontinued. Subsequent tests by three independent analysts showed the water to be satisfactory, and the supply has now been resumed. The arrangements between the two councils are temporary only, and my right hon. friend is informed by the Malton council that they will at an early date submit to him a scheme for a permanent supply.

Mr. T. WILLIAMS asked if the hon. Member was aware that in this district, where there had been 25 deaths and 3 other very bad cases of fever, the people were terrified, and were all collecting water from a pump in a brewery yard. Ought not the hon. gentleman to try to persuade the local authorities to do something in the matter?

Mr. SHAKESPEARE said that the Ministry of Health had had frequent consultations with the local authorities to decide which of the three was the best water-supply.

Housing and Slum Clearance

Mr. HICKS asked the Minister of Health, and Mr. NEIL MACLEAN asked the Secretary of State for Scotland, the total number of houses at March 31st, 1933, or nearest possible date, which had been completed since 1919 under the various State-assisted schemes by local authorities and by private enterprise respectively; the total number of houses completed in the same period by unassisted private enterprise; and the number of local authorities houses which had been provided under slum-clearance schemes.—Mr. SHAKESPEARE replied to Mr. Hicks: The following statement shows the number of houses returned by local authorities as having been completed in England and Wales by local authorities and private enterprise since Jan. 1st, 1919:—

With State Assistance.	By local authorities.	By private enterprise.	Total.
Housing Town Planning, &c., Act, 1919	170,090	4,545	174,635
Housing (Additional Powers) Act, 1919 ..	—	39,186	39,186
Housing, &c., Act, 1923 ..	75,309	362,738	438,047
Housing (Financial Provisions) Act, 1924 ..	445,521	11,953	457,474
Housing Act, 1930 ..	7,800	6	7,806
Total to Feb. 28th, 1933	698,720	418,428	1,117,148
Without State assistance (to Sept. 30th, 1932)* ..	8,140	852,255	860,395
Grand total—Houses completed ..	706,860	1,270,683	1,977,543

* The latest date up to which information is available.

In addition to the above, 13,343 houses have been provided to rehouse persons displaced under improvement and reconstruction schemes confirmed prior to the Act of 1930.

Mr. SKELTON (Under-Secretary of State for Scotland) replied to Mr. Neil Maclean: During the period from 1919 to Feb. 28th, 1933, the latest date for which information is available, 111,336 houses were completed under State-assisted schemes by local authorities in Scotland, and 31,897 by private enterprise. In addition, 2552 steel houses were completed in that period by the Second Scottish National Housing Company. The number of houses completed by unassisted private enterprise between 1919 and Dec. 31st, 1932, the latest date for which information is available, is 20,904. As regards the last part of the question, 20,356 of the local authority houses already mentioned were provided with State assistance under the provisions of Subsection 3 of Section I. of the Housing, &c., Act, 1923, and under the Housing (Scotland) Act, 1930, for the replacement of unfit houses.

Mrs. RUNGE asked the Minister of Health if his department had further considered the best methods of handling the temporarily dispossessed residents of slum areas under clearance; and whether, as a result of such consideration, he was prepared to offer any advice on the subject to local authorities.—Mr. SHAKESPEARE replied: My right hon. friend has arranged that his officers shall be available for consultation by individual authorities on all aspects of work under the Act of 1930, but the circumstances of different towns vary so greatly that he is not at present clear that he could usefully offer any further general advice on this subject at the present moment.

A Vaccination Prosecution

Mr. GROVES asked the Home Secretary whether his attention had been called to the prosecution of Mr. A. J. Fadden, 105, Monega-road, Forest Gate, E., who refused to have his child vaccinated; whether he was aware that Mr. Fadden was ordered to pay three guineas costs, and that requests for an account of how these costs were made up had been refused; and whether he would call the attention of the clerk to the East Ham court to Mr. Fadden's legal right to such an account.—Sir J. GILMOUR replied: I have received representations to this effect from Mr. A. J. Fadden and the National Anti-Vaccination League. The court can award such costs as seem to it just and reasonable; and I have no authority to intervene in the matter.

Workmen's Compensation in Malaya

Mr. HICKS asked the Secretary of State for the Colonies whether he had yet ascertained the position as regards the enforcement of the Workmen's Compensation Act in the Straits Settlements and the Federated Malay States.—Mr. MALCOLM MACDONALD (Parliamentary Secretary to the Colonial Office) replied: It was found necessary to suggest to the High Commissioner that certain amendments should be made in the Federated Malay States Enactment before bringing it into operation. I have no information as to when it will be found possible to introduce the amending measure, but I assume that in the meantime the Governor of the Straits Settlement will prefer to defer bringing the corresponding ordinance into operation in the Colony. But the Governor will be asked to insure that there will be no unnecessary delay.

WEDNESDAY, APRIL 12TH

Sanitary Accommodation in Shops

Mr. RHYS DAVIES asked the Home Secretary whether he would take steps during the present session of Parliament to amend the law relating to the provision of sanitary accommodation in shops in accordance with the recommendation contained in paragraph 285, volume 1, of the Report of the Select Committee on Shop Assistants.—Sir J. GILMOUR replied: The question of sanitary accommodation in shops is included in the matters which are being considered in connexion with proposals for amending legislation, but I am afraid that there is no prospect now of the introduction of such legislation during the present session.

Heating Apparatus in Shops

Mr. RHYS DAVIES asked the Home Secretary whether he had now considered the recommendation contained in paragraph 290, volume 1, of the report of the Select Committee on Shop Assistants; and what action, if any, had been taken in relation to the installation of heating apparatus in shops.—Sir J. GILMOUR replied: Inquiries have been carried out, at my request, by the Minister of Health in accordance with the recommendation referred to, and the results of these inquiries are now under consideration. The question of temperature in shops is included in the matters which are being considered in connexion with proposals for amending legislation, but I am afraid that there is no prospect now of the introduction of such legislation during the present session.

Mortality-rate at Stockton

Mr. LAWSON asked the Minister of Health whether his attention had been drawn to the inquiry (see THE LANCET, March 4th, p. 470) of the medical officer of health for Stockton-on-Tees into the causes of the standardised death-rate for the Mount Pleasant area, averaging 33·55 per 1000 of the population over the past five years, compared with a standardised death-rate over the same period of 10·5 for England and Wales; whether any cause had been established for so high a death-rate on a municipal housing estate; and whether he would make a further inquiry into

the matter.—Mr. SHAKESPEARE (Parliamentary Secretary to the Ministry of Health) replied: My right hon. friend has received a copy of the report to which the hon. Member refers, and it is now under consideration.

Mr. LAWSON: Is the Parliamentary Secretary aware that this report is the result of careful investigation, and that the medical officer of health concludes by saying that the high death-rate is the result of small incomes due to unemployment. Is his Department sending out someone to inquire into and confirm these statements?

Sir F. FREMANTLE: Is it not the case that the medical officer attributed the high death-rate to high rents of houses built under the 1925 Act?

Viscountess ASTOR: Will the Parliamentary Secretary also give us some statistics about the improved health of the children who are taken out of slum areas and put into municipal and better houses?

Mr. SHAKESPEARE: In answer to Sir F. Fremantle I may say that it is true that being a pre-1930 scheme the rents are much higher than they would otherwise be, and therefore the tenants may have to spend more on rent and thus have less to spend on food. In reply to the noble Lady, all the experience we have in the Department shows a remarkable increase in the health, vitality, and appetite of children who are moved out of slum areas.

Mr. LAWSON: Is the hon. Member aware that the only difference between the old and the new rent in this area is 4*s*. per week, and that the medical officer says that the high death-rate is not due so much to high rents as to low incomes as a result of unemployment?

Mr. SHAKESPEARE: That would be one factor. My right hon. friend is considering the report.

Mr. LAWSON: Has anyone been sent out to make an investigation?

Mr. SHAKESPEARE: We are considering it.

Health Visitors at Plymouth

Mr. DAVID GRENFELL asked the Minister of Health whether he was aware that an economy committee of the Plymouth local authority recommended a reduction in the staff of health visitors from 12 to 8; and that, although this recommendation had never been adopted, two vacancies arising in October and November last had not been filled; and whether, in view of the fact that for the week ended March 11th last the infant mortality-rate in Plymouth was 106, he would make representations to the Plymouth local authority as to the advisability of filling the vacancies and maintaining the full staff of health visitors.—Mr. SHAKESPEARE replied: My right hon. friend is aware of the recommendation referred to, but he has no precise information as to the health visiting staff at present employed by the Plymouth Town Council. My right hon friend is addressing a communication to the council on this matter and will inform the hon. Member of the result.

THURSDAY, APRIL 13TH

Child Marriage in India

Miss RATHBONE asked the Secretary of State for India whether he was now in a position to reply to the question asked on March 24th, 1930, on Nov. 17th, 1930, on June 8th, 1931, and on July 13th, 1931, as to what steps, if any, had been taken by the provincial governments to carry out the administrative measures recommended by the Joshi Committee as essential to the effective working of any legislation for the prevention of child marriage; and, if the information was not yet to hand, whether, in view of the fact that the Sarda Act had now been nominally in effect for three years, the information might be expedited.—Sir S. HOARE replied: The opinions of the local governments on the Joshi Committee's recommendations have been received by the Government of India and are under consideration. I have not yet received information regarding any steps taken by local governments to carry out the administrative measures recommended by the Committee, and I will ask the Government of India if it is available.

Enamelware and Antimony Poisoning

Mr. MANDER asked the Minister of Health if he had received any reports recently of injuries to health as a result of the use of enamelled vessels containing antimony, lead, and other poisonous ingredients; and what action he was taking to warn the public of the dangers likely to arise.—Mr. SHAKESPEARE replied: Two recent outbreaks of illness said to have been caused by antimony in enamelled vessels have been brought to my right hon. friend's notice since the issue of the departmental memorandum on antimony poisoning last month. As soon as he receives the report of the technical officer of the Department who is now investigating this question my right hon. friend proposes to consider whether any further legislative or other measures are required.

Unemployed Persons and Medical Benefit

Mr. LAWSON asked the Minister of Health if he would issue a short statement with a view to explaining to members of approved societies the changed positions in relation to the loss of medical benefits and pensions under the Act passed last year of those who by reason of prolonged unemployment had failed to stamp their health insurance cards.—Mr. SHAKESPEARE replied: A circular was issued to all approved societies in July of last year explaining the provisions of the National Health Insurance and Contributory Pensions Act, 1932, including the extension of title to medical benefit during the present year and of pensions rights until the end of 1935 in the case of persons who have been unemployed for several years. My right hon. friend is sending the hon. Member a copy of the circular for his information.

MEDICAL NEWS

University of London

At recent examinations at the London School of Hygiene and Tropical Medicine, the following candidates were successful:—

D.P.H.

Part I.—N. V. Birrell, W. L. Blakemore, C. E. Caudwell, R. C. Cohen, J. G. Currid, P. G. Currid, Hilda M. Davis, J. D. Dimock, J. C. St. G. Earl, C. L. S. Ferdinands, N. M. Goodman, J. M. Henderson, James Kemp, Laura H. Macfarlane, N. M. Mian, B. C. Nicholson, Brian O'Brien, T. B. Pahlajani, J. G. Paley, G. H. G. Southwell-Sander, J. M. Talati, A. J. Teal, Kathleen C. Vost, and G. A. Wilson.

University of Birmingham

The William Withering memorial lectures will this year be given by Mr. Lancelot Hogben, professor of social biology in the University of London, at the Medical Faculty Buildings at 4 P.M. on Wednesdays, from April 26th to May 24th inclusive. His subject will be the Methods of Clinical Genetics; and members of the medical profession are invited to attend.—The Ingleby lectures will be given on June 27th and 29th by Dr. Alfred F. Hess, of New York, who will speak on the Fat-soluble Vitamins.—Two lectures on the Regulations appertaining to National Health Insurance Practice will be delivered by Dr. H. Guy Dain, chairman of the Birmingham panel committee, on Thursdays, May 18th and 25th, at 4 P.M.

Wingfield-Morris Orthopædic Hospital

Last year 2602 patients were treated in the hospital and clinics, but the waiting-list continues to increase. The new nurses' quarters have been adequately equipped and the new workshop completed; the rebuilding of the wards is also approaching completion. There is now accommodation for 84 children, 20 women, and 20 men, an increase of eight beds.

Post-graduate Course at Dundee

Lectures and demonstrations are being given at the Dundee Royal Infirmary on Tuesday afternoons at 3.15 P.M. until May 23rd.

Princess Elizabeth of York Hospital for Children

A lantern lecture will be given at this hospital on Wednesday, April 26th, at 8.45 P.M., by Mr. T. Pomfret Kilner on Plastic and Reconstructive Surgery. Sir Cuthbert Wallace will be in the chair.

"British Journal of Physical Medicine"

Lord Horder has accepted the position of hon. consultant editor to this journal. Dr. R. King Brown has given up the medical editorship, and his duties will be taken over by Dr. W. Kerr Russell in association with Surg. Rear-Admiral Richard A. Ross.

Paddington Green Children's Hospital

According to the annual report of this hospital there were 845 in-patients last year. The total income from all sources was £13,177, and the expenditure £12,194. The hospital is entering upon its jubilee year, and part of a scheme of extension is to be carried out, though the economic position has prevented the appeal for £50,000 for this purpose from being pressed on a large scale.

Red Cross Day

It was decided by the British Empire Red Cross Conference to celebrate May 12th, Florence Nightingale's birthday, as Red Cross Day. This decision was endorsed at a meeting of the British Red Cross Society held at the Mansion House, London, on April 20th, when Sir George Newman gave a brief account of Florence Nightingale's career of service, and described the various activities of the British Red Cross Society at the present day.

Dr. W. Fletcher Shaw, professor of clinical obstetrics and gynæcology in the University of Manchester, and hon. secretary of the British College of Obstetricians and Gynæcologists, will be the guest of honour of the American Gynecological Society at its annual congress in Washington on May 8th.

A Yorkshire Central Hospital Fund

A county meeting at York has adopted a scheme of reorganisation of the Yorkshire voluntary hospitals committee with a view to widening its scope. It is hoped to create a central fund similar to King Edward's Hospital Fund.

Death of Prof. Bruno Bloch

The death is reported from Zürich, on April 10th, of Dr. Bruno Bloch, professor of dermatology in the University. He was born at Endingen in 1878, son of the local doctor, and was educated at the gymnasium in Basle, becoming assistant to His in 1902, and on his advise specialising in skin diseases which were then part of the medical side of the Bürgerspital. In 1913 he gained the title of professor, and in the following year was made head of a special skin department set up in the hospital, which he directed until his transfer to Zürich in 1916, where a well-equipped department was at his disposal, and he found in Guido Miescher a willing and able co-worker on the side of X rays and radium. Three years ago Bloch was invited to a chair of dermatology in Berlin, but the negotiations fell through.

Royal Sanitary Institute

The annual congress of this institute will be held at Blackpool from June 17th–24th, with Lord Cozens-Hardy as president. Sections will be devoted to preventive medicine; architecture, town planning, and engineering; maternity and child welfare and school hygiene; veterinary hygiene; national health insurance; and the hygiene of food. There will also be conferences of various groups of representatives. Sir Henry Brackenbury will preside over the section of preventive medicine. The programme may be had from the secretary of the institute, 90, Buckingham Palace-road, London, S.W. 1.—At a sessional meeting to be held at Weston-super-Mare at 5 P.M., on Friday, May 12th, Dr. W. G. Savage and Mr. S. V. Golledge will open a discussion on the prevention of human tuberculosis of bovine origin, and Dr. A. E. Remmett Weaver will read a paper on Weston as a Health Resort.

L.C.C. Hospital Out-patients

The Public Assistance Committee of the London County Council propose that a uniform scale of charges shall be adopted for the treatment of out-patients, including casualties, accidents, and other emergencies. The existing scales laid down by the boards of guardians vary greatly. The proposed scale of charges includes:—(i) Medical and surgical consultations and treatment, including massage and electrical treatment, 1*s.* 6*d.* for an attendance. (ii) Dental attendances, provided that treatment is actually given and excluding attendance for the provision and fitting of dentures, 1*s.* 6*d.* for an attendance. (iii) X ray examinations from 7*s.* 6*d.* to 30*s.*, with a charge of 2*s.* 6*d.* for each additional film taken at the same sitting, or for a film taken away. No charges are to be made in the case of: (*a*) examination after former in-patient treatment; (*b*) antenatal and postnatal attendances; and (*c*) first attendances, except for X ray examinations. It is proposed to reconsider the scale after 12 months' experience of its working.

Society for Relief of Widows and Orphans of Medical Men

At a quarterly court of directors, held on April 12th' Mr. V. Warren Low, president, being in the chair, a sum of £145 was voted as special grants to enable orphans to continue their education. £911 17*s.* 6*d.* had been received from the Inland Revue for income-tax returned for the year ending April, 1933. The death of one member was notified. A striking example of the advantages of membership of the society was reported by the secretary. A medical man, who joined in 1864, died in 1866, having paid £6 6*s.* in subscriptions. His widow (who died in 1909) and two children received in grants £2900. One of the children, who was an invalid, came on the (special) Copeland fund, and on her death in January, 1933, had received £2550—a total in all of £5450. The redrafted by-laws were passed with slight alteration, and will be submitted to the members at a special general meeting to be held on May 12th, when, if approved, they will be confirmed at the annual general meeting on May 24th. Particulars from the secretary at the offices of the society, 11, Chandos-street, Cavendish-square, London, W.1.

Medicine in the Talmud

At a meeting to be held at the Jewish Communal Centre, Tavistock-square, London, W.C., at 8.30 P.M. on Thursday, April 27th, Dr. W. M. Feldman will speak on Medicine in the Talmud.

Hospital and "Means Test"

At the annual meeting of Horsham Hospital, after considerable discussion, an amendment to the rules to admission—that the general wards should be available only for people with an annual income of less than £325—was referred to the committee for a report.

Romford Nurses' Home

Mr. Alfred Brooks, chairman of the Essex public assistance committee, recently formally opened an extension of the nurses' home at this Romford institution. The new building, which has cost £30,000, accommodates 120 nurses; the total number housed is now 250.

A Hospital Closed for a Month

In face of the unanimous opposition of the honorary medical staff, Beckenham Cottage Hospital is to be closed during the month of July for renovations, on the ground that £250 will thus be saved on the cost of the work. The medical staff contend that 30 of the 54 beds could remain open while the work proceeds.

Royal Institute of Public Health

At the congress to be held at Eastbourne from May 30th to June 4th there will be a new section devoted to hydrology and climatology. It will meet under the presidency of Sir Gilbert Walker, professor of meteorology at the Imperial College of Science and Technology, and he will give an address on Airs, Waters, and Places: their Importance in Medicine. Among the other subjects to be discussed will be records of humidity; soil and climate in relation to the rheumatic diseases; sea-bathing; smoke pollution of the atmosphere; health and holidays; the medical profession and the health resort; the sea breeze as a climatic factor; and medical indications for the sea coast. The full programme of the congress may be had from the secretary of the institute, 23, Queen-square, London. W.C. 1.

Medical Diary

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, April 24th.—8 P.M., ODONTOLOGY. Mrs. Lilian Lindsay: The Sun, the Tooth Drawer, and the Saint. (C. E. Wallis lecture.)

TUESDAY.—5 P.M., MEDICINE. Papers. Dr. G. J. Langley: Bacteriæmia in Pneumonia. Dr. R. Hilton: The Action of Artificial Pneumothorax on the Lung Lymphatics. Dr. A. J. Hall: Whooping-cough in Old Age. 8.30 P.M., PSYCHIATRY. Dr. G. W. B. James: Psychiatry and History.

WEDNESDAY.—5 P.M., COMPARATIVE MEDICINE. Discussion: Sterility. Opening papers. Mr. John Hammond: Factors Producing Sterility with Special Reference to Genetic Causes. Mr. A. S. Parkes, D.Sc.: Sterility in Relation to Endocrine Deficiency. Prof. V. Korenchevsky: Sterility in Males on Diets Deficient in Vitamin A or Vitamin E. Mr. J. T. Edwards, D.Sc.: Infectious Sterility (in the larger domesticated animals). Mr. L. P. Pugh: The Clinical Aspect of Sterility in Bovines.

THURSDAY.—8.30 P.M., UROLOGY. Clinico-pathological Meeting. Cases. Mr. H. P. Winsbury-White: 1. New Method of Implanting Ureters in the Bowel. 2. Total Cystectomy. Mr. T. E. Hammond: 3. Carbuncle of Kidney. Mr. J. G. Yates Bell: 4. Total Cystectomy for Papilloma of Bladder after Ureteric Transplantation. Mr. Harold Dodd: 5. Nephro-ureterectomy for Tuberculous Kidney. 6. Carcinoma of Bladder and Preliminary Transplantation of Ureters into the Rectum. Mr. A. E. Roche: 7. Old Hæmatoma of the Epididymis. Mr. F. McG. Loughnane: 8. Diverticulum of the Bladder. Mr. H. L. Attwater: 9. Diverticulum of the Bladder.

FRIDAY.—8.30 P.M., EPIDEMIOLOGY AND STATE MEDICINE. Dr. P. H. J. Turton: The Distribution of Simple Goitre in Derbyshire. Members of the Section of Medicine are specially invited to attend.

CHELSEA CLINICAL SOCIETY.

TUESDAY, April 25th.—8.30 P.M. (Hotel Rembrandt, Thurloe-place, S.W.), Mr. Lawrence Abel: Surgery of the Autonomic Nervous System. (With cinematographic demonstration.)

MEDICO-LEGAL SOCIETY.

THURSDAY, April 27th.—8.30 P.M. (11, Chandos-street, W.), Mr. H. C. Dickens: Negligence in Hospitals and its Legal Consequences.

NORTH-WEST LONDON MEDICAL SOCIETY.
TUESDAY, April 25th.—8.30 P.M. (at Willesden Constitutional Club House, 110, Walm-lane, N.W.), Dr. Bernard Hart: Psycho-analysis and General Practice.

ST. JOHN'S HOSPITAL DERMATOLOGICAL SOCIETY, Leicester-square, W.C.
WEDNESDAY, April 26th.—4.15 P.M., Dr. I. Muende: Allergic Eruptions Associated with Furgus Infections of the Skin.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, April 24th, to SUNDAY, April 30th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square. Demonstrations of Surgical Technique, Wed., at 8.30 P.M., Dr. G. F. Stebbing: Radium and Operative Treatment of Malignant Glands of the Neck (illustrated by epidiascope).—MAUDSLEY HOSPITAL, Denmark Hill, S.E. Afternoon course in Psychological Medicine.—LONDON CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road. Course of Physical Medicine three evenings weekly at 8 P.M.—SAMARITAN HOSPITAL, Marylebone-road, N.W. Week-end course in Gynæcology.—HAMMERSMITH HOSPITAL, Ducane-road, W. Tues. and Fri., 10 A.M., three demonstrations on Plastic Surgery.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
MONDAY, April 24th.—Intensive Post-graduate Course daily.

ST. PETER'S HOSPITAL FOR STONE, Henrietta-street, W.
WEDNESDAY, April 26th.—3 P.M., Mr. R. O. Ward: Elucidation of Urinary Symptoms.—Hæmorrhage.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
WEDNESDAY, April 26th.—4.30 P.M., Mr. W. K. Irwin: Diagnosis and Treatment of Some Important Bladder Conditions.

ST. MARK'S HOSPITAL, City-road, E.C.
THURSDAY, April 27th.—4.30 P.M., Dr. J. Browning Alexander: Tuberculous Disease of the Colon.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
THURSDAY, April 27th.—3 P.M., Dr. Douglas McAlpine: The Cerebral Symptoms of Arterial Hypertension and their Treatment.

PRINCESS ELIZABETH OF YORK HOSPITAL FOR CHILDREN, Shadwell, E.
WEDNESDAY, April 26th.—8.45 P.M., Mr. T. Pomfret Kilner: Plastic and Reconstructive Surgery.

MANCHESTER ROYAL INFIRMARY.
TUESDAY, April 25th.—4.15 P.M., Mr. Harry Platt: The Stiff and Painful Shoulder.
FRIDAY.—4.15 P.M., Mr. E. W. Telford: Demonstration of Surgical Cases.

WESTERN INFIRMARY, Glasgow.
WEDNESDAY, April 26th.—4.15 P.M., Mr. J. M. Renton: Surgical Cases.

Appointments

London County Council.—Senior Assistant Medical Officers (Grade I.): LAURENT, L. J. M., M.B. Lond., M.R.C.S., Western Hospital; SEARS, W., M.D., M.R.C.P. Lond., St. George-in-the-East Hospital; GUNN, A. L., M.D. Wales, F.R.C.S. Edin., St. Leonard's Hospital. Senior Assistant Medical Officers (Grade II.): MAHER, R. M., M.D., M.R.C.P. Lond., St. Andrew's Hospital; WESSON, A. S., M.D., M.R.C.P. Lond., Mile End Hospital; NORRIS, T. ST. M., M.R.C.P. Lond., D.P.H., St. Leonard's Hospital; BOLAND, C. R., M.D., F.R.C.S. Irel., St. Stephen's Hospital; THOMPSON, A. R., M.D., D.P.H., South Western Hospital; PIERCEY, J. E., F.R.C.S. Edin., New End Hospital. Assistant Medical Officers (Grade I.): CARTER, E. L., M.D. Edin., D.P.H., New End Hospital; CAHILL, J. T., M.R.C.S., Archway Hospital; RUSSELL, A. W., M.B., Glasg., Downs Hospital for Children; BURGES, C. P., M.B. Edin., St. Luke's Hospital, Lowestoft. Assistant Medical Officer (Grade II.): JONES, A. N., M.B. Liverp., Queen Mary's Hospital, Sidcup. Clinical Assistants: WILSON, Miss M. S., M.B. N.Z., St. Mary Abbots Hospital; SIMPSON, W., M.D. Glasg., St. Stephen's Hospital. House Physicians: WYKES, H. W., M.R.C.S., St. James's Hospital; BIRNBAUM, A., M.R.C.S., Lewisham Hospital.

Certifying Surgeons under the Factory and Workshops Acts: CURTIS, C. F., L.M.S.S.A. Lond. (Droitwich District of the county of Worcester); STAINES-READ, T., M.B., B.Chir. Camb. (Henley District of the county of Oxford).

Vacancies

For further information refer to the advertisement columns

Barking Borough.—Asst. M.O.H. and Asst. School M.O. £650.
Bexhill Hospital.—Appointments to Honorary Staff.
Birmingham and Midland Eye Hospital.—H.S. £110.
Birmingham, City, Maternity and Child Welfare Dept.—Three Temporary M.O.'s. Each £9 10s. per week.
Birmingham, Dudley-road Hospital.—Cas. O. At rate of £200.
Blackburn Royal Infirmary.—Fourth H.S. At rate of £150.
Bootle General Hospital.—H.P. At rate of £150.
Bradford Royal Infirmary.—H.S. £135.
Brighton, Royal Alexandra Hospital for Sick Children.—H.S. and H.P. Each £100.
Cardiff Royal Infirmary.—Cas. Surg. O. At rate of £75.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Hon. Second and Third Assts. to Out-patients' Dept.
Cheltenham General and Eye Hospitals.—H.S. £200.
Chester Royal Infirmary.—H.P. £150.
Coventry and Warwickshire Hospital.—H.S. for the Aural and Ophthalmic Depts. At rate of £125.
Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—Asst. Obstetrician.
Forest Gate Hospital, Forest-lane, Forest Gate, E.—Deputy Med. Supt. £525.
Harold Wood Hospital, Essex.—Res. Asst. M.O. £250.
Hospital for Sick Children, Great Ormond-street, W.C.—Res. Med. Supt. £300.
Ilford, King George Hospital.—H.S. At rate of £100.
Kingston-upon-Hull City and County.—Asst. M.O.H. £600.
Lincoln, Bracebridge Mental Hospital.—Second Asst. M.O. £425.
Lincoln County Hospital.—Jun. H.S. At rate of £150.
Liverpool County Borough.—Jun. Asst. School M.O. £700.
London Homœopathic Hospital, Great Ormond-street, W.C.—Res. M.O. At rate of £100.
London Jewish Hospital, Stepney-green, E.—Res. M.O. and H.P. Also Cas. O. Each at rate of £150. And H.S. At rate of £100.
Macclesfield General Infirmary.—Second H.S. At rate of £150.
Manchester City.—Police Surgeon. £800.
Minehead and West Somerset Hospital.—Res. H.S. At rate of £150.
National Hospital for Diseases of the Heart, Westmoreland-street, W.—Out-Patients' M.O. At rate of £125.
North Shields, Public Assistance Institution, Preston-road.—Asst. M.O. At rate of £200.
Reading, Royal Berkshire Hospital.—Cas. O. £150.
Rochester, St. Bartholomew's Hospital.—H.S. At rate of £175.
Royal Chest Hospital, City-road, E.C.—H.P. At rate of £100.
St. Thomas's Hospital Medical School, University of London.—Demonstrator in Physiology. £400.
Scarborough Hospital and Dispensary.—H.S. At rate of £175.
Sheffield Royal Infirmary.—Asst. Aural and Ophthalmic H.S. At rate of £80.
Stepney Metropolitan Borough.—M.O.H. and Chief Administrative Tuber. O. £1200.
Stockport Infirmary.—H.P. £150.
Stoke-on-Trent, City of.—M.O. of V.D. Centre. £750.
Tunbridge Wells and Counties General Hospital.—H.S. £160.
University College, Gower-street, W.C.—Bucknill Scholarship. 160 guineas. Two Exhibitions. Each 55 guineas. Also Bayliss-Starling Memorial Scholarship. £120.
Watford County Institution, Shrodells.—H.S. At rate of £150.
Westminster Hospital, Broad Sanctuary, S.W.—Asst. Pathologist. £350.

The Chief Inspector of Factories announces vacant appointments for Certifying Factory Surgeons at Portobello, Midlothian; Tranent, East Lothian; Crieff, Perth; Kingston, Surrey; Nailsworth, Gloucester; Beaminster, Dorset; and Clayton-le-Moors, Lancaster.

Births, Marriages, and Deaths

BIRTHS

BAWTREE.—On April 11th, at Welbeck-street, W., the wife of David William Bawtree, F.R.C.S. Edin., Frant-road, Tunbridge Wells, of a daughter

HARRISON.—On April 14th, at Beckenham, the wife of W. R. E. Harrison, M.R.C.S., of "Grasmere," Swanley, Kent, of a son.

JORY.—On April 12th, the wife of Philip Jory, D.S.O., F.R.C.S., of a son.

LINDUP.—On April 1st, at Palestine General Hospital, Sarafaud, the wife of Squadron-Leader C. A. Lindup, Royal Air Force Medical Service, of a daughter.

MARSHALL.—On April 10th, at Devonshire-place, W., to Mary (née Hext), the wife of L. P. Marshall, M.B., Taunton, of a son.

NICHOLSON-LAILEY.—On April 6th, at Bentinck-street, W., the wife of J. R. Nicholson-Lailey, F.R.C.S., Taunton, of a daughter.

WOODS.—On April 15th, at Domus, Hedgerley-lane, Beaconsfield, the wife of Fergie Woods, M.R.C.S., of a daughter.

MARRIAGES

BLOMFIELD—BELL.—On April 10th, quietly, in London, Joseph Blomfield, O.B.E., M.D., to Dorothy Kathleen Bell.

DEATHS

BROWN.—On April 9th, at Rottingdean, near Brighton, Sidney Gordon Brown, M.R.C.S. (lately Resident Medical Officer, Medway Hospital, Chatham), aged 34 years.

DON.—On April 16th, at Ashford, Kent, Alexander Don, F.R.C.S., late of Aberdeen, aged 70.

HENDERSON.—On April 10th, at Two Oaks, Bosley Way, Christchurch, Hants, Frederick William Henderson, L.R.C.P.I.

HOLLAND.—On April 13th, at Queen Anne's-gardens, W., James Frank Holland, M.D., for many years Resident English Physician and British Consul at St. Moritz, Switzerland.

JEKYLL.—On April 14th, at Gainsborough-house, Leytonstone, Lewis Nugent Jekyll, M.R.C.S.

MARTEN.—On April 8th, at Crafers, South Australia, Robert Humphrey Marten, M.D., of Adelaide and Artillery-mansions, Westminster.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

THE PERSONALITY OF THE SKIN *

By JOHN T. INGRAM, M.D., M.R.C.P.

PHYSICIAN IN CHARGE OF THE DERMATOLOGICAL DEPARTMENT, GENERAL INFIRMARY, LEEDS; LECTURER ON DISEASES OF THE SKIN IN THE UNIVERSITY OF LEEDS

As practitioners of the art of medicine, I believe most of us would agree that our knowledge of dermatology is by no means profound. There are many reasons why this lack of knowledge is rather surprising. The medicine of the skin must, presumably, be the same as that of the many other organs of the body concerning which we are apt to talk with authority. The fundamental physiology of this one organ cannot differ from that of the whole; its reaction to environmental influences, its powers and manner of adaptation, must be analogous, and the channels of disease and disorder are vascular and nervous. Why, then, are we not masters of dermatology, for the skin is displayed to our view, and with this organ alone we are on intimate terms?

The skin is no mean organ. It combines the functions of most of the others of the body and is essential to life. It is a respiratory, an excretory and secretory organ; a sensory organ of the greatest importance; a vital protector, especially in the matter of heat regulation, and it has other important functions upon which, as yet, we merely speculate. It is one organ of the body concerning whose behaviour we may be certain the patient will take the most lively interest, and, if he is intelligent, he will expect us to be able to apply our knowledge effectively to this which is not hidden from our view and has not to be considered through the mists of X ray screens and stethoscope tubes.

Why have we shunned the skin? Maybe there persists in our ears the clanging of a bell and the melancholy cry "unclean," which disturbed the peace of mind of the Wandering Jew. Certain it is that in the days when medicine was magic and the art of the healer rested with the necromancer, great store was held by the skin. It is to be regretted that the quack has been allowed to keep his hold upon this, above all other branches of medicine, by our neglect in applying to it the principles of general medicine. The quacks thrive here by the application of their knowledge of human nature, but they do infinite harm through their ignorance of medicine.

The expressions of disease in the skin must resemble those arising elsewhere in the body, since the one is a part of the whole, the channels of approach are the same and the methods of skin reaction demonstrate the fundamental principles of physiology. I stress this because orthodox dermatological teaching tends to lead us to believe that we are dealing with something far removed from the realms of general medicine, some weird and wonderful land of bad dreams, and I am sure that this must serve the quack better than it serves the practitioner of medicine. I stress it because our medical training and medical curricula almost encourage us to pass by things dermatological on the other side, and the present agitation against special subjects may see us dispossessed of the very little wine and few pence we now have. Rather than a special subject, it seems to me that dermatology should be the first, the introductory chapter to the book of general medicine.

At the lower end of the evolutionary scale the external covering of the organism is the complete and sole sensory organ. It exists not only for tactile sensation, but it sorts the wheat from the chaff, good from evil, friend from foe. I presume that pleasure and pain, love and hate, must all come to the surface in these early forms of life. In the course of evolutionary development a portion of the ectoderm is folded in and subsequently takes over nervous function, but the intimate relationship between the two persists even in man. It is not difficult to understand how the skin, already an extension of the central nervous system, becomes in man an extension of the mind, an essential part of the individual temperament and personality.

What the Skin Discloses

Writ large upon the skin of every patient is a wealth of information of which we should avail ourselves. Secrets of character, physiological and psychological types, may be disclosed through the skin and its appendages when no other avenue of approach is allowed us. The skin may suggest impending death or a return of vitality. Most of the acute specific fevers declare themselves in the skin. If you respect the skin you will not treat as anæmia the nervous pallor which so often masquerades under that label. The Chinaman-yellow of pernicious anæmia, the tongue and spoon-shaped nails of microcytic anæmia, the ghastly whiteness of acute leukæmia, are often diagnostic. Combinations of anæmia with, for instance, jaundice and pigmentation suggest a wide field of clinical medicine. I may mention the febrile herpes of respiratory infections; the flush of lobar pneumonia and the heliotrope cyanosis of influenzal pneumonia; the mitral facies; the purple congestion of polycythæmia; the telangiectasia of hepatic disease; and the capillary pulsation of aortic incompetence.

The deadly pallor of gastric hæmorrhage and the reflex flush accompanying its arrest are skin manifestations, as are the variations of the gastric facies. Xanthosis and xanthomatosis, the combined pallor and pigmentation of the nephritic, the pigmentary disturbances accompanying pregnancy and endocrine gland disorders, especially those of the thyroid and suprarenal glands—these are a few examples from a long list of diagnoses in which some, and often the major, reliance is placed upon the skin.

One of the chief rewards of a study of dermatology is the assistance it gives in training the observer to differentiate between the pathological and the physiological—a differentiation which is, I believe, fundamental in the practice of medicine. Upon the skin, where the processes are displayed to the eye, the diagnosis is easy, and curative treatment is readily applied. It is so much more simple here than elsewhere because it is on the surface. Consider cancer of the skin and compare it with cancer of other organs. It is, however, the physiological disorders which are fascinating, instructive, and so very much more difficult to master.

Physiological Significance of the Skin

We should not allow the criminologist and detective, the novelist and dramatist, alone to make use of the knowledge written upon the skin.

The greasy skin of the seborrhœic is not a lone manifestation, and tells more than that puberty, or changes simulating puberty, are present. The seborrhœic has a flabby, mucus-secreting gastro-intestinal tract. The mucous membranes of his nose and throat show as poor resistance to infection as his skin, so that he is subject to chronic infection of the lymphoid tissues and sinuses, to pyorrhœa and gingivitis, soft teeth and caries. His respiratory tract is often of similar type, and his nervous system throughout lacks tone and normal activity, as may be seen in his circulation, his general behaviour and habits.

The hyperidrotic skin will usually point to a whole constitutional variation from the normal which can perhaps be shortly summed up in the suggestion of hyperthyroidism, yet the skin may be the only thing present likely to urge you to look for an explanation of skin and constitutional troubles in this direction. Mild hyperthyroidism is surely more easily recognised

* Read before the York Medical Society on Jan. 14th.

clinically in the skin than by scientific investigation—the sweating, flabby palm of a tremulous hand, dystrophic nails, the large moist, tremulous and œdematous (tooth-marked) tongue, the flushed face and staring expression, and extraneous transient blushings.

Gross myxœdema, dyspituitarism and adrenal deficiency have their hall-marks on the skin and are recognised with ease, but I am quite sure that the mere suggestions of these affections of the skin—dryness and harshness, with dull, lustreless, brittle hair and furrowed nails, for example, or the odd pigmentations which are dubbed with elaborate dermatological labels—are as important indications of endocrine dysfunction as is dysmenorrhœa.

The fine sensitiveness of xeroderma will almost certainly present a family or personal history of troubles of the allergic order, and these dermal reflections should help the clinician.

Presenile baldness, extensive or areate alopecias indicate no dermatological disease, but are often a measure of the intelligence and earnestness of the subject and of his ability to keep pace with the march of civilisation. It is useless to look elsewhere than to the type of subject and his relationship to environment for the explanation of these troubles, in spite of our trichologists.

The nails provide an abundance of information, quite apart from the implications drawn from cosmetics and manicuring, or the significance of nail-biting. Flattening and concavities of the nails, especially of those of the index fingers, mark those who are unstable physiologically and nervously. Variations in this characteristic in the same individual may be most instructive. Seen in infants, it may assume normal characters with growth and the achievement of greater stability, from proper care in upbringing during the early months and years of life. It is sometimes carried through life, sometimes acquired in adult life, sometimes confined to the index fingers, but significant always of that nerve and physiological sensitiveness. Gross furrowing may be the mark of a severe illness, such as pneumonia, and may be convenient in dating an event. The severity of the constitutional shock and the susceptibility of the patient determine the degree of furrowing, and in this way you may discover of how serious moment has been an event which the patient's record might not have indicated with accuracy. Nails which are much indented, furrowed, and pitted convey similar significance and should impress the physician as indicating influences which, by the vascular or nervous channels, are interfering with the proper physiological functions of the nail matrix, and therefore of other tissues in the body, though the other tissues may not show evidence in clinical signs. Do not be deceived, of course, by local skin diseases or over-diligent manicuring, traumatising the nail matrix. Signs of the latter should normally be more marked on the left hand than the right, and may be suspiciously regular.

Variations in skin colour—essentially dependent upon the tone of the superficial arterial plexuses in the skin—establish pallor or the reverse and have their significance. It is combinations of skin colour, skin texture, tone and muscular activity which make up expression with its wealth of information. Here tales of gastric behaviour, suggestions of hysteria, pain, and pleasure, and the general level of intelligence—all proclaim themselves in the countenance.

This may savour of detective medicine, which may be great fun but of no great consequence. I doubt it. The tendency to respect constitutional medicine—neo-Hippocratic medicine, as we now term it—is, in my opinion, a tendency in the right direction, and the more we can learn of constitutional characters the better equipped we may be. I believe the great clinicians, whom science, we are told, is ousting from our midst, did not neglect these tokens. It is enough to draw your attention to this aspect of my subject. Couple it with the common stigmata of hair colour and hair disposition, with eye colour, tongue characters, nail features, and I dare suggest that in a few seconds, having shaken hands with and glanced upon the countenance, hair, and tongue of your patient, you will have acquired more valuable information than a laboratory often will furnish in a month.

Constitutional medicine is of immense importance and the skin is a medium through which much can be learned of constitutional types. The variations are instructive. As no two individuals are alike, no two skins are identical. They reflect the individuals, their individuality, their personality—not of temper and temperament only, but of their whole physiological make-up: endocrine, circulatory, and nervous.

Physiological Eruptions of the Skin

Physiological eruptions of the skin, as opposed to pathological diseases, are less simple to dermatologist and physician, and are consequently disguised behind a host of meaningless names which frighten, impress, or deceive the profession and the laity more often than they elicit the scorn which is their due.

I may enumerate a few of the labels we use for these physiological disturbances: pruritus, prurigos, urticarias, erythemas, eczemas, nevrodermites, lichenifications, seborrhœic dermatoses, acne, rosacea, psoriasis, lichen planus, exfoliative dermatitis, pityriasis, alopecias. There is a great deal common to the ætiology of all and, as we would expect, treatment is often the same for labels which seem as different as chalk from cheese.

My point is that these eruptions are not evidence of local disease. They may be symptomatic of general disease, past or present, and I admit that we should eliminate this possibility first. More often, however, they are expressions of constitutional peculiarities, disturbances, or reactions with which we are able to cope according to our ability to understand constitutional medicine and to practise it, to discover and assess environmental considerations (a very wide field) and influence them, to break bad habits, re-train and re-educate, and to destroy the delusion of disease in our own minds and in the minds of our subjects. This is not always as difficult as it sounds. The proper understanding of a case, the ability to convey to patient or parent this understanding and perception, and the prescribing of measures often rational, often symptomatic, but always helpful, will frequently be the means of encouraging back into normal behaviour a good constitution which has gone wrong. It is true that these physiological variations from the normal sometimes acquire such a feature of habit, as established conditioned reflexes, that it seems that no power in heaven above, or in the earth beneath, or in the waters under the earth, is capable of breaking them, but this is the exception.

It is in these manifestations of disturbed function in eruption that I see the second great value of dermatology to medicine in general as an expression of constitutional personality, and I will consider two examples in greater detail.

Infantile Eczema

Infantile eczema is the unfortunate state in which itching and scratching have become established as constitutional reflexes. Whether it comes from within or from without, or whether it comes through the emotions, every variation from the normal is reflected as itching in a nervously hypersensitive epidermis—which is the expression of a hypersensitive individual.

The factors determining the likelihood of this are numerous: heredity; age and type of parents; circumstances of pregnancy, confinement and of the early weeks of life; the actual and the psychological environment of the infant; the question of other children; the reaction of parent or parents to the infant; the question of feeding, excitement, rest, suggest one group. The individuality of the child is another factor. No generalisations are true, but it is a fact that the great majority of the subjects of infantile eczema are above the average in intelligence and will intellectually — possibly artistically — outstrip the

normals. They are by heredity or through environment, or both, hypersensitive, and for this reason more readily perceive and appreciate opportunities as they arise.

Given these conditions, something then disturbs this sensitive organism, with its sensitive exterior. It is sometimes, though rarely, active nervous shock. More commonly it is exposure; the onset in January, February, and March as shown by Hall indicates this. Not uncommonly the provoking cause is a gastro-intestinal upset with absorption of irritant products from the bowel, or often a combination of the latter with nervous irritation from teething. Sometimes it is the local inflammation accompanying vaccination, or a napkin rash, or impetigo, or seborrhœic dermatitis, or even scabies.

It matters little what has been the exciting cause, but only that some trigger has let off this itching, which becomes a constitutional reflex, while restlessness, rubbing, and scratching establish the eczema. All sorts of associated environmental considerations may then readily become related to this reflex activity.

If taken early, the disorder can sometimes be corrected with ease; if well established, it will be difficult, in proportion to control over the circumstances. If the infant can be taken from his surroundings, can be put into the charge of an understanding nurse, and can be protected from harmful environmental associations of the eczema, displays to relations, anxiety and fussing, irritating amusements with rattles, wireless, &c. (it is impossible to enumerate these possibilities), the cure is still relatively easy. Generally some sedative may be necessary for a while to depress the level of reflex activity, and some antipruritic local application, coal tar being the best. Restraint is entirely contra-indicated, since it must cause mental anguish and pain to parent and child. The most in this direction should be gloves and cardboard splints over the elbows.

The short cut to this in out-patient hospital practice is to take the babe off the breast (to diminish harmful maternal influences); to substitute a perfectly simple, normal dietary; to regulate the bowels; to prescribe a tar paste locally and, if necessary, an adequate sedative internally. These cases should not persist as serious problems for more than a few weeks if we are given a reasonable chance with them. I am sure it is exceedingly harmful when they do persist.

To the family physician it should mean much that he has treated a babe for infantile eczema. It gives him an insight into the character and constitution which is likely to be of the greatest value in considering affections of later life. It should also guide his advice to the parents concerning upbringing.

Rosacea

What is the significance of an eruption such as rosacea, essentially dependent as it is upon instability, and especially upon dilatation, of the vessels of the skin of the face?

As would be expected, infections of the mouth, nose, throat, and accessory sinuses are an occasional, though rare, cause of this affection. Quite commonly an acute, transient infection of the upper respiratory tract will cause the relapse of rosacea which has been cleared.

The reflex relationship between the behaviour of the stomach and facial flushing or pallor suggests an association between rosacea and abdominal troubles. I would point out that hypochlorhydria is not a cause of rosacea, and the administration of hydrochloric acid is no cure, but it is true that many cases show hypochlorhydria as an associated expression of an underlying constitutional physiological variation from the normal, or as an evidence of abdominal disease. Rosacea may rarely be dependent upon abdominal disease, and you may be led into the realms of major abdominal surgery for its correction.

Again, since puberty, menstruation, and the menopause are characterised by blushings and flushings of the face, we expect and find these endocrine disturbances playing the essential rôle in the causation of a further group of cases. It is often difficult to exclude secondary emotional disturbances as the causative factor here.

Emotional instability, however, is the essential consideration in the great majority of cases and is probably a factor in all. The waxing and waning of the rosacea, like blushing, is a measure of the mental and emotional unrest of the patient. Kind words and good advice, combined with the steadying influence of luminal gr.¼ t.i.d., will do more than any pastes and lotions.

It is interesting to note the high incidence of this affection in the artistic and in the teaching professions.

Though it may not be difficult temporarily to subdue rosacea by topical applications, it is desirable, for the good of the patient and for our own reputations, that we should seek the correct interpretation of this symptom and, if possible, correct the underlying disease or constitutional disorder.

I have endeavoured to persuade you that an eruption upon the skin is rarely of purely local significance in spite of a precise dermatological label. I am very conscious of the fact that an exact interpretation of these signs must wait upon a fuller knowledge of the normal physiological functions of the skin, but that is no reason why we should hesitate to use our powers of observation and apply our medical knowledge, to the best of our ability, to the interpretation of skin manifestations. I suspect that we should not be happy if we had to be judged as clinicians by our ability to interpret dermatological medicine.

The skin is worthy of attention and we do less than justice to our intelligence by our general neglect of this organ. In the realms of constitutional medicine, I believe an understanding of what I have described as the personality of the skin is an essential part of the equipment of a good physician. I should like to see dermatology take a more prominent place in the life of our teaching hospitals and medical schools, and believe that this would be to the advantage of general medicine.

A STUDY OF SUBLIMATION IN MALES

Mr. W. S. Taylor, of Worcester, Mass., who contributes "A Critique of Sublimation in Males" to the series of Genetic Psychology Monographs (Clark University Press. Pp. 115, $2) begins by defining sublimation as "the diversion of sex energy into higher forms of activity." He seeks in this study to ascertain how far "complete sublimation" had been achieved by 40 unmarried American men between the ages of 21 and 30, selected as being superior to the average in athletic ability, intellectual power, social propensities, and "æsthetic rating." By complete sublimation is apparently meant a condition in which no sexual activities whatever are indulged in.

The author obtained his data by personal conversation and by a follow-up letter. In a table there are allocated to the 40 subjects who comprise the study a maximum of 3 marks each for their intellectual, athletic, æsthetic, and social activities. These marks are added up to a total, and the sexual activities are then charted under five headings according to whether the man made one or other of these adjustments: by nocturnal emissions (7 of the 40), by embraces rather regularly to the extent of orgasm at the time or during the subsequent night's sleep (6), by masturbation (25), by prostitutes (3), by liaisons with women (5). From these findings, the author draws the conclusion:

> "This means that there is in young men an irreducible minimum of sexuality, in the sense of cumulative secretion, stimulation from within, and erotic sensitisation: a complex physiological process, glandular, circulatory, nervous, muscular. This nuclear eroticism is never transmuted or sublimated away. On the contrary, it requires and finds some direct outlet in every case. It follows that the conception of sublimation, though undoubtedly pointing towards some real physiological and psychological processes, fails of scientific usefulness."

The study ends with an attempt to interpret sublimation in terms of such processes as limited shift

of activity, reintegration and reconditioning of emotional components, release of intentional or purposive attitudes through similar volitional situations, and other comparable processes. The author's findings do not prove—they do not even suggest—that sex energies cannot be diverted into the "higher forms of activity" of his definition, whatever these may be. They indicate that in 40 superior people these energies could not be so completely transmuted as to cease altogether to be themselves.

ALCOHOL IN THE BLOOD OF MOTOR DRIVERS

A FURTHER SCANDINAVIAN TEST

Dr. Klaus Hansen, professor of pharmacology at the University of Oslo, relates his experiences (Tidsskrift for den Norske Lægeforening, Jan. 15th) during the past 18 months with 373 samples of blood sent to the Pharmacological Institute because their donors (all of them men) were suspected of driving motor-cars under the influence of alcohol. The samples were sent by 52 doctors practising in different parts of Norway, and in 318 cases they were accompanied by a report from the doctor whether in his opinion the driver was (1) sober, (2) under the influence of alcohol, or (3) drunk. Prof. Hansen's experience suggests that this distinction is not satisfactory in practice; it was largely responsible for the much higher percentage of positive clinical diagnoses in his series than in 500 cases investigated by Widmark in Sweden. It is worth noting that in every category of the Norwegian material there was a certain proportion of cases in which the clinical evidence was in the motor driver's disfavour. One driver found by an examining doctor to be "under the influence of alcohol" had a concentration of only 0·03 per mille of alcohol—i.e., the normal alcohol content of the blood. There were special reasons in his case for being very nervous in the situation in which he found himself, and had it not been for the blood test the consequences would have been serious for him. It is evident that taking samples of the blood of motor drivers for an analysis of its alcohol content has entered into the practice of a considerable proportion of the doctors in Norway.

Parts per 1000 of alcohol in the blood.	Cases.	Clinical diagnosis.			Percentage of positive diagnosis.	
		Sober.	Under the influence of alcohol.	Drunk	In this series.	In a Swedish series for comparison
0·01–0·20	15	13	2	0	13	0
0·21–0·40	3	1	2	0	66	0
0·41–0·60	3	2	1	0	33	0
0·61–0·80	9	4	5	0	55	0
0·81–1·00	11	6	5	0	45	20
1·01–1·20	20	7	13	0	65	37
1·21–1·40	30	8	21	1	73	42
1·41–1·60	36	7	27	2	80	69
1·61–1·80	36	7	28	1	80	80
1·81–2·00	50	4	37	9	92	88
2·01–2·20	33	0	26	7	100	91
2·21–2·40	33	0	27	6	100	94
2·41–2·60	21	2	11	8	91	94
2·61–2·80	9	0	6	3	100	100
2·81–3·00	4	0	0	4	100	100
3·01–3·20	2	0	1	1	100	100
3·21–3·40	1	0	0	1	100	100
3·41–3·60						
3·61–3·80	1	0	0	1	100	
4·81–5·00	1	0	0	1	100	

A SOCIETY FOR THE TEACHING OF PHONETICS

A NUMBER of distinguished laryngologists have just founded the *Société française de phoniatrie*, with Prof. Moure as its first president, Dr. Haufant and Prof. Lemaitre vice-presidents, and Dr. Tarneaud secretary. Its aim is the study of the physiology and pathology of the voice, both in speaking and in singing, and there is doubtless scope for its activities when, as Prof. Moure remarked in his opening address, we can hardly fail to realise how many professional singers, and even the majority of teachers of singing, are convinced of the ignorance of laryngologists on the subject. The membership of the society does not seem to be confined to doctors, for Prof. Lemaitre laid stress on the necessity of thorough scrutiny of candidates who are not medical men. The society is issuing a journal of its own, the *Revue française de phoniatrie*, the first number of which contains an interesting lecture by Prof. Moure and Dr. Junca emphasising the importance of recognising by laryngoscopy the larynx which is incapable of powerful work, and the necessity for culture of the voice in early childhood in view of the work required of it professionally in adult life.

INDIVIDUAL PSYCHOLOGY

As honorary secretary and editor of the Medical Society of Individual Psychology (11, Chandos-street, London, W.1), Dr. F. G. Crookshank writes:—

In the appreciative notice on p. 805 of your last issue you speak of the "little pamphlets of the Individual Psychology Group becoming familiar. . . ." May I say that the pamphlets referred to form the quarterly journal of the Medical Society of Individual Psychology and are circulated gratis to the members and associates of the Society, now numbering, with Dr. Adler as honorary president and Prof. Langdon Brown as chairman, nearly 120. Many of the members are general practitioners: the associates are medical students. The title—not quite accurately given in your review—changes with the commencement of a third volume in July to Individual Psychology Pamphlets, thus indicating the increasing support given by educationists and others who are not strictly "medical." To strengthen this interest and support, the Individual Psychology Club has modestly begun activities at 62, Torrington-square, W.C.1, and Miss Dudley Short, the honorary secretary, will be glad to give information to inquirers.

A PANEL OF LECTURERS ON HYDROLOGY

WITH the object of familiarising medical men with spa methods and characteristics, the Committee for the Study of Medical Hydrology in Great Britain has drawn up a panel of lecturers, all of whom have expert knowledge of climatology and spa treatment. These lecturers are available to give addresses, illustrated by films and lantern slides, to any medical school or medical society. The lectures deal with the nature of, and indications for, spa treatment, as well as the grounds for selection of a particular spa, and the steps to be taken by the practitioner who wishes to send a case for treatment. The present panel consists of:

Bath: Dr. V. Coates, Dr. R. G. Gordon, Dr. F. G. Thomson, Dr. R. Waterhouse. *Buxton:* Dr. C. W. Buckley, Dr. J. Barnes Burt, Dr. L. C. Hill. *Cheltenham:* Dr. J. Rupert Collins. *Harrogate:* Dr. W. Edgecombe, Dr. Michael Foster, Dr. Geoffrey Holmes, Dr. G. L. Kerr Pringle, Dr. E. Solly, Dr. Bertram Watson. *Llandrindod Wells:* Dr. R. Ackerley, Dr. A. Bassett Jones, Dr. J. Murray, Dr. G. V. Worthington. *London:* Dr. W. S. C. Copeman, Dr. L. C. E. Calthrop, Dr. R. Fortescue Fox, Dr. R. L. J. Llewellyn, Dr. J. Campbell McClure, Dr. M. B. Ray. *Torquay:* Dr. K. R. Collis Hallowes. *Woodhall Spa:* Dr. L. H. H. Boys.

Particulars of the lectures and of the facilities offered for visits to the various spas may be obtained from Dr. Leslie C. Hill, hon. secretary to the Committee, at 1, Hardwick Mount, Buxton.

Dr. L. B. C. TROTTER writes: One occasionally hears some curious mispronunciations. I think the following one is worth placing on record: This afternoon one of our local district nurses, while proudly showing me some alterations in her garden, remarked gloomily: "Ah, but I have had a terrible bother with my perineal border!"